POTENTIAL CONTRIBUTIONS OF CONTAMINANTS OF CONCERN FROM HISTORICAL OPERATIONS IN THE VICINITY OF LOWER PASSAIC RIVER – OPERABLE UNIT NO. 2 DIAMOND ALKALI SUPERFUND SITE

STANDARD TALLOW CORPORATION

61 BLANCHARD STREET
NEWARK, NEW JERSEY

AND

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MARCH 6, 2017

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EXECUTIVE SUMMARY

The Lower Passaic River is a 17-mile long tidal stretch of the Passaic River running from Dundee Dam in Passaic County, New Jersey to the confluence of the river with Newark Bay in Essex and Hudson Counties, New Jersey. The Diamond Alkali Superfund Site is located on the Lower Passaic River and Operable Unit 2 (OU2) of the Diamond Alkali Superfund Site addresses contaminated sediments in the lower 8.3 miles of the Lower Passaic River. Contaminants of Concern (COCs) identified in the Record of Decision for OU2 are Dioxins and Furans, PCBs, mercury, DDT, copper, Dieldrin, PAHs and lead.

Standard Tallow Corporation (STC) was identified by EPA as a PRP for OU2 due to historical operations at the STC Newark and Kearny Facilities which are located in the drainage area of the Lower Passaic River. STC operated an animal rendering plant at the Newark Facility from approximately 1912 until approximately 1986 and an animal rendering plant at the Kearny Facility from approximately 1986 to approximately 1996. Darling Ingredients Inc. (formerly Darling International Inc.) acquired 100 percent of the common stock of STC in May 1996.

On behalf of Darling Ingredients Inc. (Darling), PBW evaluated the potential historical contribution of the STC Newark and Kearny Facilities to the COCs identified for the lower 8.3 miles of the Lower Passaic River. The evaluation concluded the following:

- The STC Newark and Kearny Facilities processed organic raw materials into tallow and meat and bone meal. No chemicals were used as part of the rendering processes and both facilities utilized only steam to process the raw materials.

- The STC Newark and Kearny Facilities were located in the Passaic Valley Sewerage Commission (PVSC) combined sewer service area. Wastewater generated from the Newark Facility may have been discharged directly to the Passaic River from approximately 1912 until approximately 1926 and was discharged to the PVSC combined sewer system from approximately 1926 until approximately 1986. Storm water from the STC Newark operations (and other industries in the area) may have been discharged directly to the Passaic River from approximately 1912 to approximately 1917 and was discharged to a separate storm sewer along Blanchard Street prior to entering the river from 1917 until approximately 1986. Wastewater and storm water generated from the Kearny Facility were discharged to the PVSC combined sewer system from approximately 1986 to 1996.

- Discharges to the PVSC combined sewer system from the STC Newark and Kearny Facilities were authorized under PVSC Discharge Permits. The constituents of concern in the wastewater/storm water discharged from the facilities (BOD; COD; animal/vegetable derived fat, oil and grease; nitrogen, etc.) were organic in nature. No evidence of any STC violations of the PVSC discharge permits was found in historical records for either facility.

- It is PBW's opinion that the STC Newark and Kearny Facilities are not sources for the COCs identified for the lower 8.3 miles of the Lower Passaic River due to the following:

- Wastewater discharges from current animal rendering facilities similar to the STC Newark and Kearny Facilities are regulated under the Meat and Poultry Products (MPP) category listed in 40 CFR Part 432 of the NPDES program. Effluent limitations established for the MPP category reflect the organic nature of the raw materials and the absence of chemicals used in the rendering process. None of the effluent parameters regulated under the MPP category are identified in the list of COCs identified for the lower 8.3 miles of the Lower Passaic River.

- Storm water discharges from current animal rendering facilities similar to the STC Newark and Kearny Facilities are regulated under Sector U – Food and Kindred Products of the NPDES Multi-Sector General Permit (MSGP) for Storm Water Discharges associated with Industrial Activity. The MSGP includes benchmark storm water sampling for constituents that reflect the organic nature of the raw materials and the absence of chemicals used in the rendering process. None of the benchmark storm water sampling parameters included for Sector U facilities in the MSGP are identified in the list of COCs identified for the lower 8.3 miles of the Lower Passaic River.

- Darling is the largest independent animal by-product recycling company in North America and operates over 120 animal rendering plants in the United States and Canada. Nearly all of these facilities are authorized to discharge wastewater from the rendering process to municipal sewer systems, land application areas or surface waters under permits issued by the EPA or state environmental agencies. The permits require Darling to regularly monitor the wastewater discharges for constituents that reflect the organic nature of the raw materials and the absence of chemicals used in the rendering process. None of the parameters typically monitored by Darling at its facilities are identified in the list of COCs identified for the lower 8.3 miles of the Lower Passaic River.

- Dioxins and Furans. Dioxins and furans are by-products of chemical manufacturing, combustion, metal processing and paper manufacturing and dioxin was a by-product of the manufacture of the defoliant Agent Orange and other herbicides at the Diamond Alkali facility. There is no evidence that dioxins and furans or related herbicides were used or generated at the STC Newark and Kearny Facilities.

- PCBs. PCBs were used widely as coolants and oils, and in the manufacture of paints, caulking and building material prior to being banned in the 1970s. Electrical and hydraulic equipment operated at the STC Newark Facility may have used coolants/oils containing PCBs based on the dates the facility was in operation; however, there is no evidence of any spills, releases or discharges of PCB-containing oils from the facility. This is no evidence that PCBs were used at the STC Kearny Facility.

- Mercury. Mercury is released to the environment through a variety of processes, including metals processing, burning of coal, improper disposal of medical and other wastes, industrial effluent discharge, and atmospheric deposition. There is no evidence that mercury was used or generated at the STC Newark and Kearny Facilities and mercury was not detected in wastewater samples collected from the Newark and Kearny Facilities.

- DDT. DDT is a pesticide that was used to control insects on crops and mosquitoes that spread malaria and was banned for use in the United States in 1972. There is no evidence that DDT was used at the STC Newark and Kearny Facilities, except if de minimis quantities of DDT were present in consumer insecticides used/stored in consumer-sized containers at the facilities.

- Copper. Copper enters the environment through releases from factories that make or use copper metal or compounds, leachate from landfills, combustion of fossil fuels, wood processing, fertilizer production and from natural sources such as dust from soils, volcanoes and forest fires. There is no evidence that copper was used or generated at the facilities. Copper was present at low concentrations in wastewater samples collected from the STC Newark and Kearny Facilities; however, the reported copper concentrations were well below local limits specified by the PVSC for discharge into the PVSC combined sewer system. The mass of copper attributable to the Newark Facility wastewater was negligible compared to the total mass of copper from all sources in the PVSC system and the copper detected in the wastewater likely originated as the result of corrosion of copper piping/fixtures from contact with the municipal water supplied to the Facility by the City. Copper concentrations present in the Kearny Facility wastewater were similar to the copper concentrations in the potable water supplied from the City of Kearny.

- Dieldrin. Dieldrin a pesticide that is no longer produced or used, but was once used extensively as an insecticide on crops or to control termites. STC operated animal rendering processes at the Newark and Kearny Facilities and there is no evidence that dieldrin was used at the facilities, except if de minimis quantities of dieldrin were present in consumer insecticides stored in consumer-sized containers at the facilities.

- PAHs. PAHs are a major component of petroleum products and are formed during incomplete burning of coal, oil, gas, wood or other substances. Fuel oil was used to fire boilers and diesel fuel and other petroleum oils were used to maintain trucks and equipment at the Newark and Kearny Facilities; however, there is no evidence that petroleum oil was present in wastewater discharged from the Newark and Kearny Facilities and no historical oil spills were reported for STC operations at either facility.

- Lead. Lead occurs naturally in the environment, but most of the higher levels found in the environment come from mining, factories that use lead compounds or releases to the air during the burning of coal, oil or waste. There is no evidence that lead was used or generated at the Newark and Kearny Facilities. Lead was present at low concentrations in wastewater samples collected from the Newark and Kearny Facilities; however, the reported lead concentrations were well below local limits specified by the PVSC for discharge into the PVSC combined sewer system. The mass of lead attributable to the Newark Facility wastewater was negligible compared to the total mass of lead from all sources in the PVSC system and the lead detected in the wastewater likely originated as the result of corrosion of lead piping/fixtures from contact with the municipal water supplied to the Facility by the City. Lead concentrations present in the Kearny Facility wastewater were similar to the lead concentrations in the potable water supplied from the City of Kearny.

- As described above, it is our opinion that any lead and copper present in the wastewater discharged from the STC Newark and Kearny Facilities originated as the result of corrosion of lead and copper piping/fixtures from contact with the municipal water supplied to each facility. However, even if some small amounts of lead and copper were discharged in the wastewater from the Newark Facility to the river from 1912 to 1926 (when the STC Newark Facility and other industries in the area may have discharged wastewater directly to the Passaic River), dredging of the Passaic River near the Newark facility performed in 1913, 1916, 1921, 1922, and 1937 would have removed the majority of any accumulated lead and copper from the river along with the dredged sediments and, consequently, there would not be ongoing contributions to the current contamination of the Lower Passaic.

1.0 Introduction

The Lower Passaic River is a 17-mile long tidal stretch of the Passaic River running from Dundee Dam in Passaic County, New Jersey to the confluence of the river with Newark Bay in Essex and Hudson Counties, New Jersey. The Lower Passaic River area has been heavily industrialized since the 1800s and numerous industrial facilities have historically operated along the river, including the former Diamond Alkali pesticide manufacturing facility located at 80-120 Lister Avenue in Newark, New Jersey. Based on the results of investigations performed by the New Jersey Department of Environmental Protection (NJDEP) and the U.S. Environmental Protection Agency (EPA), the Diamond Alkali facility and segments of the Lower Passaic River were determined to be contaminated primarily by dioxins and PCBs and the Diamond Alkali Superfund Site was added to the CERCLA National Priorities List in 1984. Over time, the Diamond Alkali Superfund Site was expanded to include the following operable units:

- Operable Unit 1 (OU1) - the former Diamond Alkali pesticide manufacturing facility;
- Operable Unit 2 (OU2) – contaminated sediments in the lower 8.3 miles of the Lower Passaic River from Newark Bay (River Mile (RM) 0) to RM 8.3.
- Operable Unit 3 (OU3) - contaminated sediments in the Lower Passaic River above RM 8.3 and contaminants in the water column for the entire Lower Passaic River; and
- Operable Unit 4 (OU4) - the Newark Bay Study Area, including Newark Bay and portions of the Hackensack River, Arthur Kill and Kill van Kull.

The EPA released a Record of Decision (ROD) for Operable Unit 2 on March 3, 2016. EPA has identified Diamond Alkali Company (later merged into Occidental Chemical Corporation) and more than 100 other industries and municipalities as Potentially Responsible Parties (PRPs) for contaminated sediments in the lower 8.3 miles of the Lower Passaic River. Standard Tallow Corporation (STC) was identified as one of the PRPs due to historical operations at the following locations within the drainage watershed of the lower 8.3 miles of the Lower Passaic River:

- 61 Blanchard Street (1912 to 1986)
  Newark, New Jersey
  Passaic River Reach: Harrison
  Approximate Passaic River RM: 2.6
- 1215 Harrison Avenue (1986 to 1996)
  Kearny, New Jersey
  Passaic River Reach: Harrison
  Approximate Passaic River RM: 3.4

Darling Ingredients Inc. (formerly Darling International Inc.) acquired 100 percent of the common stock

of STC in May 1996.

Darling Ingredients Inc. (Darling) has requested that Pastor, Behling & Wheeler, LLC (PBW) evaluate the potential contribution of these former STC facilities to the contaminants of concern (COCs) identified for OU2 in relation to other confirmed/potential sources of contamination in OU2 of the Diamond Alkali Superfund Site. This report presents the findings of the evaluation. For the purposes of this report, the abbreviation "STC" refers to Standard Tallow Corporation.

A summary of OU2 of the Diamond Alkali Superfund Site is presented in Section 2.0 of this report. The history of the former STC facilities is described in Section 3.0. Historical industrial processes operated at the STC facilities and the potential contaminants associated with those operations are described in Section 4.0. The potential contributions of contaminants of concern in OU2 from the STC facilities are evaluated in Section 5.0. The findings and conclusions of the evaluation are presented in Section 6.0. References are provided in Section 7.0.

2.0 DIAMOND ALKALI SUPERFUND SITE OPERABLE UNIT 2

2.1 Lower Passaic River Description

The Lower Passaic River is an approximately 17-mile long tidal stretch of the Passaic River running from Dundee Dam (RM 17.4) in Passaic County, New Jersey to the confluence of the river with Newark Bay in Essex and Hudson Counties, New Jersey (RM 0) (USEPA, 2016). Figure 1 shows the extent of the Lower Passaic River and the location of the former STC facilities relative to the river.

The lower 8.3 miles of the Lower Passaic River (OU2) are located in highly developed urban areas of Essex County (west river bank) and Hudson County (east river bank) and the surrounding watershed has a history of extensive industrial development stretching back to the 1800s (USEPA, 2016). Numerous industrial operations have historically been located along the banks of the river, including manufactured gas plants, paper manufacturing and recycling facilities, petroleum refineries, pesticide manufacturers, pharmaceutical and chemical manufacturers, paint and dye manufacturers and other industries. Near the confluence of the river with Newark Bay, near-shore land uses are predominantly commercial and industrial. Farther upriver (beginning near RM 4), commercial uses of near-shore properties begin to be mixed with more residential and recreational uses. Improved shorelines (bulkheads, rip rap) currently make up approximately 95 percent of the banks of the lower 8.3 miles of the river.

The Lower Passaic River has a federally authorized navigation channel running between the mouth of the river at the confluence with Newark Bay (RM 0.0) and the Eight Street Bridge in Wallington, New Jersey (RM 15.4). (USEPA, 2016; USACE, 2010). The navigation channel was first constructed in the 1880s and extended from Newark Bay to approximately RM 8.1. The channel was expanded to approximately RM 15.4 in 1915. The depth of the navigation channel ranges from 30 feet near Newark Bay to 10 feet at the upstream reaches and the authorized width of the navigation channel varies based on river mile as follows:

- RM 0.0 to RM 7.1: 300 feet wide
- RM 7.1 to RM 8.1: 200 feet wide
- RM 8.1 to RM 15.4: 150 feet wide

The Lower Passaic River was dredged numerous times from the 1880s to the early 1980s (USACE, 2010). The dredging history for the river reaches within which the former STC facilities were located can be summarized as follows:

STC Facility	Passaic River Reach	Years Dredging Performed
61 Blanchard Street Newark, New Jersey	Harrison Reach	1884, 1899, 1906, 1913, 1916, 1921, 1922, 1937
1215 Harrison Avenue Kearny, New Jersey	Harrison Reach	1884, 1899, 1906, 1913, 1916, 1921, 1922, 1937

The objective of the dredging operations was to remove accumulated sediments from the river to increase the depth and width of the waterway. Regular dredging of the Lower Passaic River was required since sediments naturally accumulate in the river as a result of the local hydrologic environment. The dredging operations typically affected thousands of feet along the length of river, removing tens of thousands of tons of sediment during each event.

2.2 Diamond Alkali Superfund Site Operable Unit 2 History

The Lower Passaic River is a part of the Diamond Alkali Superfund Site and a detailed description of the history of the Superfund Site is included in the ROD (USEPA, 2016). In the early 1980s, the NJDEP and EPA performed investigations at a former pesticide manufacturing facility located at 80-120 Lister Avenue in Newark, New Jersey (RM 3.4), which was operated by the Diamond Alkali Company during the 1950s and 1960s.

Manufacturing of the pesticide dichlorodiphenyltrichloroethane (DDT) and other products began at the 80-120 Lister Avenue facility in the 1940s. From 1951 to 1969, the chemical 2,4,5- trichlorophenol (2,4,5-TCP) and the herbicides 2,4-dichlorophenoxyacetic acid (2,4-D) and 2,4,5-trichlorophenoxyacetic acid (2,4,5-T), ingredients in the defoliant "Agent Orange", were manufactured at the facility. A by-product of manufacturing Agent Orange was 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD).

Based on the results of the NJDEP and EPA investigations, the Diamond Alkali Superfund Site was added to the CERCLA National Priorities List in 1984. Over time, the Diamond Alkali Superfund Site was expanded to include the following operable units:

- Operable Unit 1 (OU1) - the former Diamond Alkali pesticide manufacturing facility;
- Operable Unit 2 (OU2) – contaminated sediments in the lower 8.3 miles of the Lower Passaic River from Newark Bay (RM 0) to RM 8.3.
- Operable Unit 3 (OU3) - contaminated sediments in the Lower Passaic River above RM 8.3 and contaminants in the water column for the entire Lower Passaic River; and
- Operable Unit 4 (OU4) - the Newark Bay Study Area, including Newark Bay and portions of the

Hackensack River, Arthur Kill and Kill van Kull.

Contaminants associated with the Diamond Alkali Facility were found in sediment samples collected in the lower 8.3 miles of the Lower Passaic River and OU2 was defined by EPA to address contaminated sediments in this stretch of the river. The EPA released a Record of Decision (ROD) for OU2 on March 3, 2016.

2.3 Diamond Alkali Superfund Site Operable Unit 2 Contaminants of Concern

EPA has identified the following three Contaminants of Concern (COCs) as posing the greatest potential risks to human health in sediments in the lower 8.3 miles of the Lower Passaic River (USEPA, 2016). The ROD states that these COCs are the most bioaccumulative, most persistent in the environment, and most toxic to human beings and that these COCs are the primary focus of the response action proposed in the ROD.

- **Dioxins and Furans**. Dioxins and furans are by-products of chemical manufacturing, combustion (either in natural or industrial settings), metal processing and paper manufacturing. The dioxin congener 2,3,7,8-TCDD is the most toxic form of dioxin. 2,3,7,8- TCDD and other dioxin congeners were by-products in manufacturing processes at the former Diamond Alkali facility and elsewhere. The herbicides manufactured at the former Diamond Alkali facility included "Agent Orange," a defoliant manufactured for military purposes and shipped in drums with an orange stripe. Dioxins stay in the environment for a long time and bioaccumulate in fish and crab. Dioxins are classified as a probable human carcinogen.

- **Polychlorinated Biphenyls (PCBs)**. PCBs are manmade chemicals that were banned in the late 1970s. PCBs refers to a group of 209 congeners. Some of the congeners are referred to as dioxin-like PCBs, because they have chemical structures, physio-chemical properties and toxic responses similar to 2,3,7,8-TCDD. Some commercial PCB mixtures are known in the United States by an industrial trade name, Aroclor. Because they do not burn easily and are good insulating materials, PCBs were used widely as coolants and oils, and in the manufacture of paints, caulking and building material. PCBs stay in the environment for a long time and bioaccumulate in fish and crab. PCBs are classified as probable human carcinogens.

- **Mercury**. Mercury is a metal that is released to the environment through a variety of processes, including metals processing, burning of coal, improper disposal of medical and other wastes, industrial effluent discharge, and atmospheric deposition. Mercury stays in the environment for a long time and bioaccumulates in fish and crab. Once mercury is released to the environment, it can be converted to the biologically toxic form of methyl mercury.

The three COCs listed above were also identified as ecological COCs for the lower 8.3 miles of the Lower Passaic River. In addition, EPA identified the following other ecological COCs for OU2:

- **DDT**. DDT and its primary breakdown products, dichlorodiphenyldichloroethane (DDD) and dichlorodiphenyldichloroethylene (DDE), are ecological COCs. DDT is a pesticide that was

banned for use in the United States in 1972. It was used widely to control insects on crops and to control mosquitoes that spread malaria. These compounds bioaccumulate in fish and crab, are persistent in the environment and can cause adverse reproductive effects such as eggshell thinning in birds.

- **Copper**. Copper is a metal that enters the environment through releases from factories that make or use copper metal or compounds, leachate from landfills, combustion of fossil fuels, wood processing, fertilizer production and from natural sources such as dust from soils, volcanoes and forest fires. Although copper is an essential dietary element at low levels, at higher levels it is highly toxic in aquatic environments and bioaccumulates in fish and crab.

- **Dieldrin**. Dieldrin is a pesticide that is no longer produced or used, but was once used extensively as an insecticide on crops or to control termites. It bioaccumulates in fish and crab, and is persistent in the environment. Dieldrin is highly toxic to aquatic crustaceans and fish.

- **Polycyclic aromatic hydrocarbons (PAHs)**. PAHs are a major component of petroleum products, and are formed during incomplete burning of coal, oil, gas, wood or other substances. There are more than 100 different PAHs, which generally occur as complex mixtures. Typically, PAHs are readily metabolized by fish and wildlife, and do not bioaccumulate in aquatic food webs. They can persist in the environment under certain conditions. PAHs are toxic to invertebrates.

- **Lead**. Lead occurs naturally in the environment, but most of the higher levels found in the environment come from mining or factories that use lead compounds. Lead is also released into the air during the burning of coal, oil or waste. Lead is persistent in the environment, but does not bioaccumulate in aquatic organisms.

These COCs will be used for the purposes of evaluating potential environmental concerns related to the historical operations of the STC facilities. Tables presenting the ranges of COC concentrations found in surface sediments and at depth in OU2 as presented in the ROD are reproduced in Appendix A.

3.0 HISTORY OF STANDARD TALLOW CORPORATION FACILITIES

This section describes the history of STC and the operational history of the former STC facilities in Newark and Kearny, New Jersey as compiled from available historical information including newspaper articles, correspondence, agency reports and other historical sources. It should be noted that Darling does not admit to the accuracy of the information contained in the historical sources.

3.1 History of Standard Tallow Corporation

The Standard Tallow Company was reportedly founded in 1910 (D&B, 1994). A 1912 article in a trade publication announced that the Standard Tallow Company had begun operations at its new plant on Blanchard Street in Newark, New Jersey (National Provisioner, 1912). In 1972, the Standard Tallow Corporation was formed through the merger of the Standard Tallow Company and I. Schonwalter & Company (D&B 1994). Rencoa Inc. and Long Island Soap Company merged into STC in 1975 and Metropolitan Rendering Association merged into STC in 1976. Darling Ingredients Inc. (formerly Darling International Inc.) acquired 100 percent of the common stock of STC in May 1996 (DI, 1996).

3.2 61 Blanchard Street – Newark, New Jersey Facility

The 61 Blanchard Street property is located approximately 1,500 feet from the shoreline of the Passaic River. STC began operating at 61 Blanchard Street in Newark, New Jersey (hereafter the "Newark Facility") in approximately 1912 (National Provisioner, 1912). The history of the Newark Facility was developed using historical Sanborn Fire Insurance Maps (Appendix B), historical aerial photographs (Appendix C), and other historical documents.

Based on Sanborn Maps from 1892 and 1908, it appears that the Newark Facility property was undeveloped prior to construction of the STC facility. STC owned the Newark Facility property until 1972, when property ownership was transferred to RBI, Inc. (Partner, 2013). STC continued to operate at the Newark Facility until approximately 1986 when operations were transferred to a new STC facility in Kearny, New Jersey. In 1986, RBI sold the property to Joseph Supor and Mr. Supor sold the property to 61 Blanchard LLC that same year. The property is currently owned by 61 Blanchard LLC and has been occupied by document binding companies, die cutting companies and related operations since 1986.

3.2.1 Historical STC Facility Operations

STC began operating at the Newark Facility in approximately 1912. Facility operations circa 1912 were described as "manufacturing tallow, scrap, chicken food, etc" and the equipment was described as "a new type of jacketed kettles, heavy duty scrap presses, tallow coolers, mills, etc. (National Provisioner, 1912). In 1926, facility operations were described as "fat rendering" using "rendering kettles" (Passaic Valley Sewerage Commissioners, 1926). The 1931 Sanborn Map identifies the Newark Facility as "Standard Tallow Co. Rendering Plant" and shows two large buildings identified as "Rendering" and "Warehouse". A boiler house occupies the western end of the rendering building and heat for the facility is noted as "steam". Railroad lines border the facility on the north and south sides.

The 1950 and 1952 Sanborn Maps also identify the Newark Facility as "Standard Tallow Co. Rendering Plant" and show additional buildings and several tallow storage tanks east of the rendering building.

STC constructed a new rendering plant at the Newark Facility in 1972 (PVSC, 1972). In 1975, operations at the Newark Facility were defined as "dry rendering of animal fats" producing inedible tallow and meat meal from inedible animal fats and bones (STC, 1975). The 1973 Sanborn Map identifies the Newark Facility as "Standard Tallow Co. Rendering Plant" and shows that the buildings shown on the previous maps have been removed and replaced with a single large new building. Three tallow storage tanks are located east of the building. The map references "steam, fuel oil", indicating that steam for the rendering process is generated in boilers fueled by fuel oil.

STC submitted a sewer connection renewal application for the Newark facility to the Passaic Valley Sewerage Commissioners in 1980 (Passaic Valley Sewerage Commissioners, 1980). The activity performed at the facility is described as "production of tallow and meat meal from fat and bones". A site plan for the facility was included with the application and is reproduced in Appendix D. The site plan shows the main processing building, several storage tanks (likely for tallow) and four office trailers.

The 1988 Sanborn Map shows a similar building as the 1973 map, but does not identify the property as "Standard Tallow Co." As described earlier in this section, STC transferred all rendering operations to a new STC facility in Kearny, New Jersey in 1986.

3.1.2 Historical Wastewater and Storm Water Management

The Newark Facility property is located within the service area of the Passaic Valley Sewerage Commission (PVSC). The PVSC was created in 1902 as an agency of the State of New Jersey to reduce pollution of the Passaic River and its tributaries (PVSC, 2016). A report completed in 1908 provided the conceptual plan for a wastewater treatment plant and pumping station to be located in the City of Newark near Newark Bay and for a main intercepting sewer to be built parallel to the Passaic River between the City of Paterson and the mouth of the river in Newark Bay. Construction of the original facilities recommended in the 1908 report was completed in 1924 (PVSC, 2016).

The PVSC service area includes two types of sewer systems: a separate sewer system and a combined sewer system (PVSC, 2016). In a separate sewer system, sanitary sewers transport domestic and industrial wastewater to a wastewater treatment plant (WWTP) for treatment prior to discharge into a waterway and storm sewers transport rainwater/melted snow for discharge into a waterway through storm water outfalls (SWOs) (NJDEP, 2016). In a separate sewer system, these two types of sewers function separately from each other.

In a combined sewer system, the sanitary and storm sewers are combined into one sewer system that directs both wastewater and storm water to a WWTP for treatment prior to discharge into a waterway (NJDEP, 2016). In combined sewer areas, all wastewater flow during dry weather is conveyed to the WWTP; however, when it rains or there is snowmelt in combined sewer areas, the additional volume of rain water/melted snow can exceed the capacity of the pipes in the combined sewer system or the WWTP. Combined Sewer Overflows (CSOs) provide a hydraulic release for these combined sewer systems when they are over capacity and discharge excess wastewater and storm water directly to the waterway without treatment.

Wastewater collected by the PVSC separate sewer system and wastewater and storm water collected by the PVSC combined sewer system are conveyed to the PVSC publically owned treatment works (POTW) for treatment prior to discharge to New York Harbor (PVSC, 2016). Figure 2 shows the sections of the PVSC service area that are served by separate and combined sewer systems (TSI, 2013). Figures 3 and 4 show the locations of CSOs and SWOs in the PVSC service area (TSI, 2013).

As shown on Figure 2, the Newark Facility property is located in the Newark Combined Sewer District. As described above, STC began operating at the Newark Facility in approximately 1912. From

approximately 1912 to approximately 1926, the STC operations (and other industries in the area) may have discharged wastewater directly to the Passaic River; however, the route/path of this discharge could not be identified (Passaic Valley Sewerage Commissioners, 1926). In approximately 1926, the Newark Facility was connected to the PVSC combined sewer system (STC, 1926). Wastewater was discharged from the STC operations to the PVSC combined sewer from approximately 1926 until the STC operations were terminated in 1986.

Discharges to the PVSC combined sewer from the Newark Facility were authorized under PVSC Discharge Permit No. 20401440 (PVSC, 1981). The connection between the Newark Facility and the PVSC combined sewer is shown on the Site Plan in Appendix D. No evidence of any STC violations of the PVSC discharge permit was found in historical records.

Wastewater from the Newark Facility was pretreated on-site prior to discharge to the PVSC sewer (STC, 1980). The pretreatment system consisted of a two-stage gravity separator with automatic skimming on the first stage.

Although the Newark Facility is located in the Newark Combined Sewer District, a small section of separate storm sewer runs along Blanchard Street and discharges to the Passaic River (CBA, 1979). This storm sewer was constructed in approximately 1917 and expanded in approximately 1970 (CBA, 1979; MEI, 1916). From approximately 1912 to approximately 1917, the STC operations (and other industries in the area) may have discharged storm water directly to the Passaic River; however, the route/path of this discharge could not be identified. From approximately 1917 forward, storm water from the Newark Facility (and other properties in the area) was collected by this storm sewer and discharged to the river. The SWO outfall from the Blanchard Street storm sewer to the river is located at approximately RM 2.6 as shown on Figure 4.

3.3 1215 Harrison Avenue – Kearny, New Jersey Facility

STC acquired the property at 1215 Harrison Avenue in Kearny, New Jersey (hereafter the "Kearny Facility") in approximately 1983 (NJDEP, 1984). The history of the Kearny Facility was developed using historical city directories (Appendix E), Sanborn Fire Insurance Maps (Appendix F), historical aerial photographs (Appendix G) and other historical documents.

The earliest record found for the Kearny Facility property was a 1907 Sanborn Map which shows a large industrial complex identified as "Swift and Company" located on the property. Referenced operations

include slaughtering, oil manufacturing, liming vat room, glue manufacturing, tallow manufacturing, fertilizer manufacturing, boiler rooms and related facilities. Hog pens and slaughter operations associated with a Bimbler and Van Wagenen facility are located on the east end of the Subject Property. There is no evidence that STC operated at the property during this period.

City directories from 1907 through 1976 list "Swift & Co." and related facilities (Van Wagenen & Schickhaus Co) at the Kearny Facility property. The 1950 Sanborn Map indicates that the facility operations have expanded to include gelatin manufacturing slaughtering, oil manufacturing, liming vat room, glue manufacturing, tallow, fertilizer, boiler rooms and related facilities. Beginning with a 1954 aerial photograph, a large above ground storage tank (likely 100,000 gallon fuel oil) in a containment area is shown on the Kearny Facility property. Four large aboveground storage tanks (likely used for tallow storage) were constructed at the facility between 1954 and 1966 based on aerial photographs. Between 1970 and 1974, many of the previous structures on the property were demolished and removed based on aerial photographs. There is no evidence that STC operated at the property during this period.

City directories from 1976 through 1983 list "Harrison By-Products" at the Kearny Facility Property. Other operations (M & L Truck Cleaning) are also listed in the directories. B&L Oil Corporation reportedly leased an unspecified number of tanks from Harrison By-Products for oil storage. A 100,000-gallon fuel oil storage tank was located at the property during this period (NJDEP, 1984). There is no evidence that STC operated at the property during this period.

3.3.1 Historical STC Facility Operations

STC acquired Harrison By-Products in 1983 and constructed a "new" tallow manufacturing facility at the Kearny Facility (NJDEP, 1984; SEG, 1983). The STC Kearny Facility began operations in approximately 1986. In 1988, STC operations were described as follows (SEG, 1988):

- Fat and bones are collected and brought to the plant for processing. The processing consists mainly of grinding and cooking the incoming materials to produce various grades of tallow and bone meal. Finished tallow is stored in aboveground steel tanks and drums prior to shipment off-site.

In 1994, operations at the Kearny Facility were described as processing of scrap meat and bones to produce tallow and bone meal (SEG, 1994b).

A site plan for the Kearny Facility prepared in 1983 is reproduced in Appendix H and shows the following major facilities (SEG, 1983):

- Processing Rooms
- Meal Blending
- Boiler Rooms
- Maintenance Building
- Truck Garage
- Meal (Grain) Silos
- One 100,000-gallon Boiler Fuel Aboveground Storage Tank
- Four 80,000-gallon Tallow Aboveground Storage Tanks
- Four 100,000-gallon and one 10,000-gallon Out of Service Aboveground Storage Tanks
- One 8,000-gallon Diesel Aboveground Storage Tank
- Parking and related support areas

Darling acquired the stock of STC in 1996. Darling did not operate the tallow manufacturing operations at the Kearny Facility and it sold the Kearny Facility to Vineland Construction Company in 1998. The former STC facilities were subsequently demolished and removed from the property and a Walmart Supercenter was constructed on the property.

3.3.2 Historical Wastewater and Storm Water Management

The Kearny Facility property is located within the PVSC service area. As shown on Figure 2, the Kearny Facility property is located in the Worthington Avenue Combined Sewer District. As described above, STC began operating at the Kearny Facility in approximately 1986. Wastewater and storm water from the Kearny Facility were discharged to the PVSC combined sewer from approximately 1986 until the STC operations were terminated in 1996. Discharges to the PVSC combined sewer from the Kearny Facility were authorized under PVSC Discharge Permit No. 15404610 (PVSC, 1990; SEG, 1994b). A map showing the connection between the Kearny Facility and the PVSC combined sewer is reproduced in Appendix I. A flow diagram summarizing the sources of wastewater and storm water discharges to the PVSC combined sewer from the Kearny Facility is reproduced in Appendix J. No evidence of any STC violations of the PVSC discharge permit was found in historical records.

Wastewater from the Kearny Facility was pretreated on-site prior to discharge to the PVSC sewer (SEG, 1994a). The pretreatment system was a three stage process designed to remove floating biodegradable animal/vegetable derived fat, oil and grease from the wastewater and consisted of a grease separator, and in-ground gravity separator with a submerged discharge, and an inverted siphon.

4.0 INDUSTRIAL OPERATIONS AT THE STC FACILITIES

Based on the historical information reviewed earlier in this report, the following operations were performed at the STC Newark and Kearny Facilities:

- Animal Rendering
- Steam Generation
- Equipment and Vehicle Maintenance

Although limited specific process information is available for each location, it is likely that the processes and equipment used at these facilities were similar to industry standard processes and equipment in use during the period when these facilities were in operation. As a result, the potential for contribution from these historical facilities to the contaminants of concern for OU2 of the Diamond Alkali Superfund Site can be assessed by looking at the potential contaminants associated with the processes in operation during these periods.

4.1. Historical Industrial Operations

4.1.1 Animal Rendering Process

Animal rendering was performed by STC at the Newark and Kearny facilities. At its most basic level, rendering is the conversion of raw animal by-product materials (animal tissue, bone, etc.) to fat, protein and water through the application of heat. The composition of the raw materials varies, but an overall approximation of the typical raw material content is 60 percent water, 20 percent solids, and 20 percent fat prior to the rendering process (NRA, 2006). The fat produced from the rendering process is typically referred to as tallow and the protein is typically referred to as meal. Variations to the rendering process result in a wide variety of commodities from these two basic finished products.

There are two general types of animal rendering processes:

- Wet Rendering. The wet rendering process involves mixing water with the raw material, either by adding water directly and boiling the mixture using external heat in an open kettle or by injecting live steam into the material in an enclosed pressure vessel. The heat from the water/steam breaks down the raw material into the protein, fat and water components. Water is not evaporated in the wet rendering process and is typically drained from the kettle/vessel when the process is complete. For centuries, wet rendering was performed in open kettles. However, the open kettle process was thought to present physical safety concerns and eventually gave way to the use of enclosed vessels as the preferred method of wet rendering (NRA, 2006).

- Dry Rendering. The dry rendering process uses indirect heat applied to an enclosed pressure vessel through jacketed pipes or similar heat exchange system. The indirect heat of the dry system converts the moisture in the raw material to steam and the resulting steam pressure inside the vessel breaks down the raw material into the protein, fat and water components. This process eliminates the direct physical contact of added water or live steam with raw materials and reduces the amount of water generated by the process. The water in the raw material is evaporated in the vessel and must be condensed for recovery at the end of the process.

The wet rendering process was the earliest method of recovering fat from animal by-products; however, near the beginning of the 20th Century, the wet rendering process was replaced by the dry rendering process at most industrial rendering facilities. STC began operating at the Newark Facility in approximately 1912 and facility equipment at that time included "a new type of jacketed kettles" (National Provisioner, 1912). Since wet rendering involves mixing water/steam directly with the raw material and dry rendering uses indirect heat applied through jacketed pipes, it is likely that the Newark Facility used only the dry rendering process. The STC Kearney Facility was constructed in the early 1980s and utilized the dry rendering process.

Rendering processes can be operated in batch or continuous modes. In a batch process, the vessel is filled with raw material (and sealed if using an enclosed vessel). The material is processed under controlled conditions for a fixed period of time (usually several hours), the heat source is removed, the processed material is discharged, and the cycle is repeated. With a continuous process, the raw material is fed semi-continuously to the vessel, processed under controlled conditions, and the processed material is discharged at a constant rate. A continuous rendering system normally consists of one or two large processing units, whereas a batch system typically consists of a number of smaller process vessels.

4.1.1.1 Batch Dry Rendering Process

Dry rendering was performed as a batch process until the continuous dry rendering process was developed in the 1950s-1960s (NRA, 2006). Based on the age of the facility, it is likely that the batch dry rendering process was operated at the STC Newark Facility from 1912 until the new rendering plant was constructed in 1972 (PVSC, 1972). The STC Kearny Facility was constructed in the early 1980s and utilized the continuous dry rendering process.

Figure 5 shows a simplified process schematic for a batch dry rendering process. Raw material is delivered to the facility and ground to improve the efficiency of the process. At the top of each vessel there is a manhole through which raw material is loaded. The manhole is sealed and steam is applied to the outside surface of the vessel using jacketed steam pipes or other methods. Target temperature and

pressure are maintained in the vessel for a fixed period depending on the raw material and the desired products.

After processing is completed, the contents of the tank are allowed to cool and settle/separate. The water evaporated from the raw material in the vessel is condensed using a condenser and pumped to treatment/discharge. The fat accumulates on the top and the protein accumulates at the bottom. Gradually the pressure is reduced to atmospheric levels, and the fat is drawn off through designated points on the side of the tank. The fat is pumped to storage tanks prior to shipment. After the fat has been drawn off, the vessel is opened and the remaining solids are removed mechanically or by hand. The solids are fed to a press to separate any additional fat. The pressed solids are then dried, mechanically ground/screened to the desired quality and stored/transported off-site as protein meal. No chemicals are used as part of the batch dry rendering process. The raw material is processed using only steam.

4.1.1.2 Continuous Dry Rendering Process

The continuous dry rendering process was utilized at the Newark Facility from 1972 until facility closure in 1986 and at the Kearny Facility from 1986 until facility closure in 1996. Figure 4 shows a simplified process schematic for a continuous dry rendering process. Raw material is delivered to the facility and ground to improve the efficiency of the process. The raw material is fed semi-continuously to the process vessel. Target temperature and pressure are maintained in the vessel for a fixed period depending on the raw material and the desired products.

The water evaporated from the raw material continuously exits the vessel as steam, is condensed using a condenser, and is pumped to treatment/discharge. The fat and protein continuously exit the vessel and are separated using settling tanks, a centrifuge or similar process. The fat is pumped to storage tanks prior to shipment. The solids are fed to a press to separate additional fat. The pressed solids are then mechanically ground/screened to the desired quality and stored/transported off-site as protein meal. No chemicals are typically used as part of the continuous dry rendering process. The raw material is processed using only steam.

4.1.2 Steam Generation

Steam was an integral part of the industrial processes at both the Newark Facility and the Kearny Facility. The steam was generated from on-site boilers. Fuel oil was likely used at each of the facilities to generate steam based on the following:

- Newark Facility. No documentation was found to confirm the fuel source for the boilers prior to 1973. No on-site oil storage tanks, coal piles or coal storage areas were shown on any of the Sanborn maps; however, the 1973 Sanborn Map identifies fuel oil as the fuel used to generate steam at the facility. Based on this reference, it is likely that fuel oil was used as the boiler fuel source throughout the period of operation of the Newark Facility.

- Kearny Facility. One 100,000-gallon Boiler Fuel Aboveground Storage Tank was identified on the 1983 Site Plan for the Kearny Facility (SEG, 1983). Fuel oil stored in quantities from approximately 70,000 to 140,000 gallons was also listed on the 1993 and 1994 Community Right To Know Surveys completed for the Kearny Facility (STC, 1994a; STC, 1995). Based on these references, fuel oil was used as the boiler fuel source throughout the period of operation of the Kearny Facility.

Steam boilers evaporate steam from liquid water and require frequent replenishment of boiler feed water for continuous steam production. Continual evaporation of steam concentrates dissolved minerals from the source water as well as corrosion impurities from piping and boiler equipment. Depending on the quality of the water supply, scale formation can adversely affect steam production. To address this, boiler water is periodically discharged from the boiler, a process known as "blowdown". Chemicals can also be added to the boiler water to reduce scaling due to piping and equipment corrosion.

4.1.3 Equipment and Vehicle Maintenance

Vehicles and equipment were maintained at the Newark Facility and the Kearny Facility. The 1993 and 1994 Community Right To Know Surveys completed for the Kearny Facility list the following chemicals used/stored at the facility in quantities at or greater than 55-gallons (STC, 1994a; STC, 1995):

Substance	Container Type	Inventory Information	
		Max Daily Inventory (Gallons)	Avg Daily Inventory (Gallons)
Used Petroleum Oil	Tank	150 – 1,500	15 – 150
Diesel Fuel	Tank	7,000 – 14,000	1,500 – 7,000
Fuel Oil	Tank	70,000 – 140,000	14,000 – 35,000
Motor Oil	Tank	1,500 – 7,000	150 – 1,500
Ethylene Glycol	Tank	150 – 1,500	150 – 1,500
Sulfuric Acid	Drum	150 – 1,500	150 – 1,500
Sodium Hydroxide	Drum	15 - 150	15 - 150
Dimethylaminoethanol (Boiler Water Corrosion Inhibitor)	Drum	15 - 150	15 - 150
Cyclohexylamine (Boiler Water Corrosion Inhibitor)	Drum	15 - 150	15 - 150

Substance	Container Type	Inventory Information	
		Max Daily Inventory (Gallons)	Avg Daily Inventory (Gallons)
Sodium Hypochlorite	Tank	1,500 – 7,000	1,500 – 7,000

Various other chemicals (solvents, etc.) were also listed in the 1993 and 1994 Community Right To Know Surveys; however, these chemicals were only used/stored in minor quantities (container types for these chemicals were listed as "Cans" or "Bags" and the volumes were listed as 10 to 100 pounds or less). No evidence was found to indicate that these chemicals were ever released or discharged to the environment during operations at the Kearny Facility.

No documentation was found concerning the quantities and types of chemicals used for equipment and vehicle maintenance at the Newark Facility; however, it is likely that the chemicals used/stored at the Newark Facility were similar to those at the Kearny Facility, i.e., chemicals stored in the largest quantities likely consisted of fuel oil, diesel fuel and other petroleum oils with minor quantities of other chemicals used/stored. No evidence was found to indicate that these chemicals were ever released or discharged to the environment during operations at the Newark Facility.

4.2 Potential Contaminants Associated with Historical STC Operations

EPA has identified the following COCs as posing the greatest potential risks to human health and the environment in the lower 8.3 miles of the Lower Passaic River (USEPA, 2016):

- Dioxins and Furans
- Polychlorinated Biphenyls (PCBs)
- Mercury
- DDT
- Copper
- Dieldrin
- Polycyclic aromatic hydrocarbons (PAHs)
- Lead

The contamination in the lower 8.3 miles of the Lower Passaic River is the result of historical discharges from the numerous industries in the area, historical discharges from municipal/private sewers, on-going discharges from permitted outfalls, contaminated groundwater flowing into the river, historical and on-going combined sewer overflow discharges, and historical and on-going storm water runoff.

The historical information described previously in this report indicates that the Newark Facility and the Kearny Facility potentially discharged wastewater and storm water to the lower Passaic River when the

facilities were in operation, either through direct discharges to the river (the Newark Facility may have had a direct discharge from approximately 1912 to approximately 1926) or via overflows from the PVSC combined sewers in the area. A small amount of historical wastewater discharge data is available for the Newark Facility and the Kearny Facility. In addition, the processes and equipment used at the Newark Facility and the Kearny Facility were similar to industry standard processes and equipment at that time. Potential historical contributions to the COCs in the lower Passaic River from the STC facilities were evaluated by reviewing available historical wastewater data for each facility and the common contaminants typically associated with the processes used at the facilities.

4.2.1 Wastewater and Storm Water Data - Newark Facility

The following data concerning the characteristics of the wastewater and/or storm water discharged from the Newark Facility were identified in historical records:

- 1969-1971 PVSC Storm Water Inspections. The PVSC inspected the Newark Facility on several occasions from 1969 through 1971 (PVSC, 1969a; PVSC, 1969b; PVSC, 1970; PVSC, 1971). The inspections alleged flows of "turbid", "gray-brown oily liquid" with a "foul odor" from the STC operations into the storm sewer that runs along Blanchard Street near the Newark Facility. The inspections identified the source of the liquid as "poor housekeeping" of the STC yard that was "covered with decayed tallow waste product and oil" and "steam water blow off" from the Newark Facility. Samples of the liquid collected on October 7, 1971 exhibited elevated pH, turbidity, and COD/BOD.

  It should be noted that the "oil" reported during the PVSC storm water inspections likely consisted of animal oils (tallow, etc.) rather than petroleum-based oil. The elevated pH reported for the sample of the liquid is characteristic of biodegradable animal oils undergoing saponification (alkaline hydrolysis of fatty acid esters in the oil). Petroleum oils do not exhibit an elevated pH. In addition, it should be noted that no quality assurance/quality control documentation was available to confirm the validity of these samples.

- 1978 Industrial Waste Survey. The results of an industrial waste survey for the STC Newark Facility (and surveys performed for other industrial facilities in the PVSC service area) were presented in a 1978 Heavy Metals Source Determination Study by Elson T. Killam Associates, Inc. (Killam, 1978). Copper, lead and mercury concentrations reported for wastewater samples from the Newark Facility in the 1978 study are presented in Table 1. As shown in Table 1, low concentrations of copper (0.192 mg/L) and lead (0.179 mg/L) were reported for the STC wastewater. Mercury was not detected in the STC wastewater.

  Table 1 also compares the mass of copper and lead discharged from the Newark Facility to the PVSC combined sewer in 1978 relative to the total mass of copper and lead in the influent to the PVSC POTW from 1978 to 1980 (Killam, 1978; PVSC, 1987). As shown in Table 1, the mass of copper and lead attributable to the STC operations was negligible (0.0048 and 0.0026 percent) compared to the total mass of these metals from all sources in the PVSC system.

  It should also be noted that there is no evidence to indicate that the lead and copper detected in the wastewater samples from the Newark Facility were generated by the STC operations. As

described earlier in this section, animal rendering was performed by STC at the Newark Facility and lead and copper were not utilized as raw materials or generated as products as part of the animal rendering process. A more likely source of the copper and lead detected in the Newark Facility wastewater samples would be corrosion of the lead and copper piping that conveyed water supplied by the City of Newark to the Facility. Any lead or copper that entered the water used at the Facility through corrosion of piping would end up in the wastewater discharged from the Facility.

Lead piping was commonly used for service lines connecting buildings to municipal water supply mains until approximately 1930, when copper replaced lead as a service line material (AWWA, 2005). Lead service lines were common in Newark during the period that STC operated the Newark facility - as of 1984, approximately 75 percent of the approximately 54,000 active water service lines in the City of Newark still consisted of lead pipe (USEPA, 1985). Prior to the mid-1980s, lead and copper concentrations in public drinking water systems were not strictly regulated. The Safe Drinking Water Act Amendments of 1986 prohibited the use of lead pipe, solder or flux in new water system construction (USEPA, 1989). The Lead and Copper Rule of 1991 required public water systems to treat their water to minimize corrosion of lead and copper piping and fixtures, thereby reducing lead and copper concentrations in drinking water at the consumers tap (AWWA, 1990).

Lead and copper concentration data were not available for the Newark public water supply system during the period that STC operated the Newark Facility; however, it is likely that lead and copper concentrations were elevated in the water used by the Facility. First, STC began operating at the Newark Facility in approximately 1912, which predates the trend away from lead service lines to copper service lines that began in approximately 1930. As a result, the Newark Facility likely had a lead service connection and may have had other lead piping/fixtures interior to the buildings. Secondly, based on studies of other similar water systems conducted during the period that STC operated the Newark Facility, it is likely that elevated lead and copper concentrations were present in the Facility water during the STC operating period. A study performed in Boston and surrounding areas during 1976 and 1977 identified lead and copper concentrations at consumer water taps as high as 0.960 mg/L (lead) and 1.73 mg/L (copper) when municipal water was not undergoing corrosion control treatment (Karalekas, et al., 1983). Mean monthly lead and copper concentrations for all untreated tap water samples during the study ranged as high as 0.128 mg/L for lead and 0.370 mg/L for copper. These lead and copper concentrations are in the same order of magnitude as the lead and copper concentrations reported for the wastewater samples from the Newark Facility.

- 1979 and 1980 Wastewater Samples. Two composite wastewater samples were collected from the Newark Facility in December 1979 and January 1980 (Chemtec, 1980). The samples exhibited detectable concentrations of the following constituents:

  - total and suspended solids
  - oil & grease
  - chemical oxygen demand (COD)
  - biochemical oxygen demand (BOD)
  - total organic carbon (TOC)

  It should be noted that the analytical methods used for these analyses were not identified. Based on the date of the samples, it is likely that the oil and grease results were produced using EPA Method 413.1 or 413.2 (EPA, 1983). The oil and grease result reported using Method 413 would have included both polar hydrocarbons such as animal and vegetable oils and non-polar petroleum-based oils, since there is no indication that the sample was treated using silica gel (to

remove the animal and vegetable oils) prior to analyzing for oil and grease. Based on the type of operations at the Facility, it is likely that the reported oil and grease concentrations consisted of animal and vegetable oils rather than petroleum-based oils.

- 1980 PVSC Sewer Connection Application. STC submitted an application for a sewer connection to the PVSC system in 1980 (STC, 1980). The application reported that wastewater from the facility included the following potential constituents of concern, based on a composite sample of the wastewater:

  - pH:
  - total and suspended solids
  - oil & grease
  - COD
  - BOD
  - TOC

  The application also indicated that copper and lead were present in the wastewater at low concentrations (0.12 mg/L each) and that no "toxic material", "solvents" or "resins" were present in the wastewater. No information was presented concerning mercury concentrations in the wastewater.

  Also, as stated above, it is likely that the oil and grease data reflected animal and vegetable oils rather than petroleum-based oils, since there is no indication that the sample was treated using silica gel prior to analyzing for oil and grease.

Based on these data, with the exception of copper and lead, none of COCs identified for the lower 8.3 miles of the Lower Passaic River were likely to be present in wastewater/storm water discharged from the STC Newark Facility. Very low concentrations of copper and lead were present in the STC wastewater discharges; however, as described above, it is likely that the copper and lead present in the STC wastewater discharge were the result of corrosion of the lead and copper piping that conveyed water supplied by the City of Newark to the Facility and, regardless of the origin, the STC discharge constituted negligible fractions of the total mass of these metals from all sources in the PVSC system. In addition, lead and copper would not have been present in storm water discharged from the Facility, since there is no evidence that lead or copper were used or generated at the Facility. All of the constituents detected in the wastewater/storm water from the Newark Facility reflect the organic nature of the raw materials processed and the absence of chemicals used in the rendering process.

4.2.2 Wastewater and Storm Water Data - Kearny Facility

The following data concerning the characteristics of the wastewater and/or storm water discharged from the Kearny Facility were identified in historical records:

- 1989 Wastewater Samples. STC submitted analytical results from wastewater samples collected at the Kearny Facility in 1989 to the PVSC (SEG, 1990). The samples exhibited detectable

concentrations of the following constituents:

- total and suspended solids
- oil & grease
- COD
- BOD
- TOC
- Orthophosphate
- Total Nitrogen
- Ammonia Nitrogen
- Petroleum Hydrocarbons (10 to 61 mg/L)

As stated above, it is likely that the oil and grease data reflected animal and vegetable oils rather than petroleum-based oils, since there is no indication that the sample was treated using silica gel prior to analyzing for oil and grease. Based on the date of the samples, it is likely that the petroleum hydrocarbon results were produced using EPA Method 418.1 (EPA, 1983). The petroleum hydrocarbon results reported using Method 418 would have included both polar hydrocarbons such as animal and vegetable oils and non-polar petroleum-based oils unless the sample was treated using silica gel (to remove the animal and vegetable oils) prior to analysis. Based on the type of operations at the Facility, it is likely that the reported oil and grease and "petroleum hydrocarbon" concentrations consisted of animal and vegetable oils rather than petroleum-based oils.

- 1990 Sewer Connection Permit. PVSC issued a sewer connection permit to the Kearny Facility effective May 17, 1990 (PVSC, 1990). The PVSC permit required regular wastewater monitoring for the following constituents:

  - BOD
  - TSS
  - Oil and Grease

  The designated sample location in the PVSC permit was near the Kearny Facility property line and the fluid sampled included wastewater and storm water from the STC operations.

- 1994 PVSC Sewer Connection Application. STC submitted an application to renew the PVSC sewer connection permit for the Kearny Facility in 1994 (STC, 1994b). The application reported that wastewater from the facility included the following potential constituents of concern, based on a composite sample of the wastewater:

  - pH:
  - total and suspended solids
  - oil & grease
  - COD
  - BOD
  - TOC
  - Ammonia Nitrogen
  - Petroleum Hydrocarbons (average 13.1 mg/L)

  The application indicated that copper, lead, mercury, pesticides, EPA Priority Pollutants, and total toxic organics (TTOs) were "believed absent" in the wastewater.

  Also, as stated above, it is likely that the oil and grease and petroleum hydrocarbon data reflected

animal and vegetable oils rather than petroleum-based oils, since there is no indication that the sample was treated using silica gel prior to analysis.

- 1994 Local Limit Baseline Monitoring Report. STC submitted a Local Limit Baseline Monitoring Report (LLBMR) to the PVSC in 1994 (SEG, 1994b). The monitoring report presented the results of wastewater samples collected from the Kearny Facility and analyzed for various heavy metals, including copper, lead and mercury. Copper, lead and mercury concentrations reported for samples from the Kearny Facility are presented in Table 2. The average copper and lead concentrations reported for the samples were 0.030 mg/L and 0.0073 mg/L, respectively. Mercury was not detected in any of the samples (<0.00009 mg/L or "ND").

  The 1994 LLBMR also listed PVSC "Threshold Values" and "Local Limits for the heavy metals. These terms are described in the "Rules and Regulations Concerning Discharges to the PVSC Treatment Works" as follows (PVSC, 2013):

  - Threshold Value – heavy metal monitoring results are compared to the threshold value to determine if regular monitoring for the heavy metal is required.

  - Local Limit – heavy metal monitoring results that exceed the local limit concentration are a violation of the PVSC Rules and Regulations.

  As shown in Table 2, copper and lead concentrations reported in the discharge from the Kearny Facility were well below the PVSC threshold values and local limits for these constituents. The reported copper and lead concentrations in the wastewater samples were also consistent with copper and lead concentrations in the potable water supply provided to the Facility by the City of Kearny (KWD, 2016).

  The Kearny Facility wastewater lead and copper concentrations illustrate the influence of corrosion control in the public water supply on lead and copper concentrations in the wastewater discharged from the STC facilities. STC operated similar animal rendering processes at the Kearny and Newark Facilities; however, lead and copper concentrations in wastewater samples collected from the Newark Facility in 1978 were orders of magnitude higher than lead and copper concentrations collected from the Kearny Facility in 1994. The difference in lead and copper concentrations is likely due to:

  1) Age of the Facilities. STC began operating at the Newark Facility in approximately 1912 and the Newark Facility likely had a lead service connection and may have had other lead piping/fixtures interior to the buildings. The Kearny Facility began operations in approximately 1986 and likely did not have a lead service connection due to the Safe Drinking Water Act Amendments of 1986 which prohibited the use of pipe, solder or flux in new water system construction (USEPA, 1989).

  2) Sampling Dates. The Newark lead and copper wastewater samples were collected in 1978 and the Kearny lead and copper wastewater samples were collected in 1994. The Lead and Copper Rule of 1991 required public water systems to treat their water to minimize corrosion of lead and copper piping and fixtures, thereby reducing lead and copper concentrations in drinking water at the consumers tap (AWWA, 1990).

- 1993 and 1995 PVSC Inspections. PVSC representatives inspected the Kearny Facility in 1993 and 1995 (PVSC, 1993; PVSC 1995). The inspections concluded that "Categorical Organics", including dioxins, PCBs, DDT, and PAHs were not used at the Kearny Facility. These constituents were also not listed in the 1993 and 1994 Community Right To Know Surveys for

the Kearny Facility (STC, 1994a; STC, 1995). As a result, it is unlikely that any of these constituents would have been present in wastewater/storm water from the Kearny Facility.

Based on these data, none of COCs identified for the lower 8.3 miles of the Lower Passaic River were likely to be present in wastewater/storm water discharged from the STC Kearny Facility. Detected copper and lead concentrations in the STC wastewater discharge were comparable to the lead and copper concentrations in the potable water received from the City of Kearny and lead and copper would not have been present in storm water discharged from the Facility, since there is no evidence that lead or copper were used or generated at the Facility. All of the constituents detected in the wastewater/storm water from the Kearny Facility reflect the organic nature of the raw materials processed and the absence of chemicals used in the rendering process.

4.2.3 Typical Characteristics of Wastewater Discharged From Animal Rendering Process

As mentioned earlier, rendering is the conversion of raw animal by-product materials (animal tissue, bone, etc.) to solids (protein/minerals), fat, and water through the application of heat. With slight technical variations, modern rendering processes are similar to the rendering processes historically operated at the Newark Facility and Kearny Facility. Consequently, the potential contaminants of concern associated with wastewater/storm water discharges from the historical rendering operations at the STC facilities were likely similar to contaminants of concern in wastewater/storm water discharges from modern rendering facilities.

4.2.3.1 EPA Meat and Poultry Products Point Source Category Effluent Limits

The EPA prepared a Technical Development Document for the Final Effluent Limitations Guidelines and Standards for the Meat and Poultry Products Point Source Category in 2008 as part of the National Pollutant Discharge Elimination System (NPDES) program (USEPA, 2008). The objective of the document was to review wastewater discharge data from facilities included in the Meat and Poultry Products (MPP) category (which includes animal rendering) and identify priority, conventional, and nonconventional pollutant parameters of concern in these wastewaters. Based on this document, EPA promulgated 40 CFR Part 432 – Meat Products Point Source Category and established effluent limitations for the following constituents of concern in animal rendering wastewater:

- pH
- BOD
- TSS
- oil & grease
- fecal coliform bacteria

- ammonia nitrogen
- total nitrogen

All of these parameters reflect the organic nature of the raw materials and the absence of chemicals used in the rendering process. None of these parameters are identified in the list of COCs identified for the lower 8.3 miles of the Lower Passaic River.

4.2.3.2 EPA Industrial Storm Water Permit – Food and Kindred Products

The EPA promulgated the current NPDES Multi-Sector General Permit for Storm Water Discharges associated with Industrial Activity (MSGP) in 2015 (USEPA, 2015). The objective of the MSGP is to reduce pollutants in storm water discharged from 29 industrial sectors. Animal rendering operations are included in Sector U – Food and Kindred Products, Subsector U2 of the MSGP.

The MSGP includes benchmark sampling to evaluate the quality of the storm water being discharged from the industrial facilities. The benchmark monitoring parameters vary by industrial sector and reflect the parameters of concern in the storm water discharged from each specific sector. The following benchmark monitoring parameters are listed for fats and oils facilities (including animal rendering operations) in the MSGP:

- BOD
- COD
- nitrate plus nitrite nitrogen
- TSS

As with the MPP effluent limitations discussed in the previous section, all of these parameters reflect the organic nature of the raw materials and the absence of chemicals used in the rendering process. None of these parameters are identified in the list of COCs identified for the lower 8.3 miles of the Lower Passaic River.

4.2.3.3 Darling Rendering Facility Operations

Darling is the largest independent animal by-product recycling company in North America and operates over 120 animal rendering plants in the United States and Canada. Nearly all of these facilities are authorized to discharge wastewater from the rendering process to municipal sewer systems, land application areas or surface waters under permits issued by the EPA or the individual state environmental agencies. The permits require Darling to regularly monitor the wastewater discharges for the constituents of concern identified by the regulatory agencies. Although the monitoring parameters vary slightly from

permit to permit, the most frequently monitored wastewater parameters at the Darling facilities are as follows:

- pH
- BOD
- TSS
- oil & grease
- coliform bacteria
- nitrogen (ammonia, nitrate, total)
- phosphorus

All of these parameters reflect the organic nature of the raw materials and the absence of chemicals used in the rendering process. None of these parameters are identified in the list of COCs identified for the lower 8.3 miles of the Lower Passaic River.

4.2.4 Typical Steam Generation Operations

Steam was generated using on-site boilers at the STC Newark and Kearny Facilities. Fuel oil was used as boiler fuel at both facilities and the fuel oil was stored on-site in aboveground storage tanks; however, there is no evidence to suggest that fuel oil was discharged/released from the STC operations to the Passaic River:

- Newark Facility. As part of PVSC inspections during 1969-1971, some evidence of "fuel oil" was reportedly observed in the flows of "turbid", "gray-brown oily liquid" with a "foul odor" from the STC operations into the storm sewer that runs along Blanchard Street near the Newark Facility; however, the source of this liquid was identified as "poor housekeeping" of the STC yard that was "covered with decayed tallow waste product and oil" and "steam water blow off" from the Newark Facility rather than releases of fuel oil (PVSC, 1969a; PVSC, 1969b; PVSC, 1970; PVSC, 1971). As described previously, the elevated pH reported for the sample of the liquid collected during these inspections is characteristic of biodegradable animal oils undergoing saponification rather than fuel oil that does not exhibit an elevated pH.

  In addition, a Preliminary Assessment Report (PRA) was prepared for the Newark Facility property in 2013 (Partner, 2013). As described previously, STC vacated the Newark Facility property in 1986. The PRA did not identify any historical reported oil/chemical spills at the Newark Facility.

- Kearny Facility. A 1988 Spill Investigation Report was filed for the Kearny Facility by the NJDEP (NJDEP, 1988). The investigation was performed in response to a complaint by STC concerning a spill of oil from a third-party (Whaleco Oil) truck. The spill was contained and remediated and did not flow off the property. No other records concerning reported oil/chemical spills at the Kearny Facility were identified. There is also no evidence that petroleum oil was present in significant quantities in wastewater discharged to the PVSC combined sewer from the STC operations, since only low petroleum hydrocarbon concentrations (10 to 61 mg/L) were reported in wastewater samples collected from the Kearny Facility (SEG, 1990; SET, 1994b)

Boiler blowdown water was identified as a component of the wastewater discharged from the Newark and

Kearny Facilities. The boiler blowdown may have contained calcium, magnesium, iron, copper, aluminum, silica, and related compounds, since these constituents are present in the source water used to generate the steam (GE, 2014; KWD, 2016; NDWSU, 2016). Copper is included in the list of COCs identified for the lower 8.3 miles of the Lower Passaic River; however, copper is typically only present in trace quantities in boiler blowdown and the quantity of copper discharged from the facilities due to boiler blowdown would likely have been negligible (USEPA, 1997). This is supported by the low concentrations of copper present in the wastewater samples collected at both facilities as described earlier in Section 4.1 of this report.

4.2.5 Typical Equipment and Vehicle Maintenance Operations

As described in Section 4.1.3 of this report, vehicles and equipment were maintained at the Newark and Kearny Facilities. The 1993 and 1994 Community Right To Know Surveys completed for the Kearny Facility indicate that the chemicals stored/used as part of STC operations primarily consisted of fuel oil for the boilers (see previous Section 4.2.4) and diesel fuel, with drums/small tanks of lubricating oil, ethylene glycol (antifreeze), boiler water chemicals, sulfuric acid, sodium hydroxide and sodium hypochlorite and small, consumer-sized containers (cans/bags) of solvents and other chemicals (STC, 1994a; STC, 1995). Although no documentation was found concerning the quantities/types of chemicals used for equipment and vehicle maintenance at the Newark Facility, it is likely that the chemicals used/stored at the Newark Facility were similar to those at the Kearny Facility, i.e., chemicals stored in the largest quantities likely consisted of fuel oil, diesel fuel and other petroleum oils with minor quantities of other chemicals used/stored.

As described in Section 4.2.4, there is no evidence that petroleum oils were released to the Passaic River from the STC Newark and Kearny Facilities. None of the other chemicals used/stored at the facilities in quantities larger than consumer-sized containers are included on the list of COCs identified for the lower 8.3 miles of the Lower Passaic River.

5.0 POTENTIAL CONTRIBUTION OF CONTAMINANTS OF CONCERN TO LOWER 8.3 MILES OF THE LOWER PASSAIC RIVER

Contamination in the lower 8.3 miles of the Lower Passaic River is the result of historical discharges from the numerous industries in the area, historical discharges from municipal/private sewers, on-going discharges from permitted outfalls, contaminated groundwater flowing into the river, historical and on-going combined sewer overflow discharges, and historical and on-going storm water runoff. The STC Newark and Kearny Facilities may have discharged wastewater and storm water to the lower Passaic River when the facilities were in operation, either through direct discharges to the river or via overflows from the PVSC combined sewers in the area. The potential contributions of contaminants of concern in the lower 8.3 miles of the Lower Passaic River due to the STC operations in relation to other confirmed/potential sources of contamination in the vicinity of the river are evaluated in this section.

STC operated animal rendering plants at the Newark Facility from approximately 1912 to approximately 1986 and at the Kearny Facility from approximately 1986 to 1996. Wastewater generated from the STC facilities consisted of process wastewater from animal rendering and storm water. The animal rendering process uses steam to render the raw material and no chemicals are used in the process. As a result, the primary constituents of concern in the wastewater/storm water from the Newark and Kearny Facilities (BOD; COD; TSS; animal/vegetable derived fat, oil and grease; nitrogen) reflect the organic nature of the raw materials processed and the absence of chemicals used in the rendering process. Wastewater and storm were discharged from the STC Facilities in the following manner:

- Newark Facility: 1912 to 1926 – wastewater may have been discharged to river (route unknown)
  1926 to 1986 – wastewater discharged to PVSC combined sewer system
  1912 to 1917 – storm water may have been discharged to river (route unknown)
  1917 to 1986 – storm water discharged to separate storm sewer along Blanchard Street.
- Kearny Facility: 1986 to 1996: - wastewater and storm water discharged to the PVSC combined sewer system.

The potential contributions of the COCs identified in the lower 8.3 miles of the Lower Passaic River due to wastewater/storm water discharges from the Newark and Kearny Facilities are evaluated as follows:

- **Dioxins and Furans**. Dioxins and furans are by-products of chemical manufacturing, combustion, metal processing and paper manufacturing and dioxin was a by-product of the manufacture of the defoliant Agent Orange and other herbicides at the Diamond Alkali facility (EPA, 2016). STC operated animal rendering processes at the Newark and Kearny Facilities and there is no evidence that dioxins and furans or related herbicides were used or generated at the

facilities. Inspections performed at the Kearny Facility in 1993 and 1995 concluded that dioxins were not used at the Kearny Facility and dioxins were not listed in the 1993 and 1994 Community Right To Know Surveys for the Kearny Facility. As a result, it is our opinion that dioxins and furans would not have been present in wastewater/storm water from the Newark and Kearny Facilities and the facilities are not considered a source of dioxins and furans to the Passaic River.

- **Polychlorinated Biphenyls (PCBs)**. PCBs were used widely as coolants and oils, and in the manufacture of paints, caulking and building material prior to being banned in the 1970s (EPA, 2016). Electrical and hydraulic equipment operated at the Newark Facility may have used coolants/oils containing PCBs based on the dates the facility was in operation; however, there is no evidence of any spills, releases or discharges of PCB-containing oils from the facility. Inspections performed at the Kearny Facility in 1993 and 1995 concluded that PCBs were not used at the Kearny Facility and PCBs were not listed in the 1993 and 1994 Community Right To Know Surveys for the Kearny Facility. As a result, it is our opinion that PCBs would not have been present in wastewater/storm water from the Newark and Kearny Facilities and the facilities are not considered a source of PCBs to the Passaic River.

- **Mercury**. Mercury is released to the environment through a variety of processes, including metals processing, burning of coal, improper disposal of medical and other wastes, industrial effluent discharge, and atmospheric deposition (EPA, 2016). STC operated animal rendering processes at the Newark and Kearny Facilities and there is no evidence that mercury was used or generated at the facilities. Inspections performed at the Kearny Facility in 1993 and 1995 concluded that mercury was not used at the Kearny Facility and mercury was not listed in the 1993 and 1994 Community Right To Know Surveys for the Kearny Facility. In addition, mercury was not detected in wastewater samples collected from the Newark and Kearny Facilities. As a result, it is our opinion that the Newark and Kearny Facilities are not considered a source of mercury to the Passaic River.

- **DDT**. DDT is a pesticide that was used to control insects on crops and mosquitoes that spread malaria and was banned for use in the United States in 1972. STC operated animal rendering processes at the Newark and Kearny Facilities and there is no evidence that DDT was used at the facilities, except if de minimis quantities of DDT were present in consumer insecticides stored in consumer-sized containers at the facilities. Inspections performed at the Kearny Facility in 1993 and 1995 concluded that DDT was not used at the Kearny Facility and DDT was not listed in the 1993 and 1994 Community Right To Know Surveys for the Kearny Facility. As a result, it is our opinion that DDT would not have been present in wastewater/storm water from the Newark and Kearny Facilities and the facilities are not considered a source of DDT to the Passaic River.

- **Copper**. Copper enters the environment through releases from factories that make or use copper metal or compounds, leachate from landfills, combustion of fossil fuels, wood processing, fertilizer production and from natural sources such as dust from soils, volcanoes and forest fires (EPA, 2016). STC operated animal rendering processes at the Newark and Kearny Facilities and there is no evidence that copper was used or generated at the facilities. Copper was present at low concentrations in wastewater samples collected from the Newark and Kearny Facilities; however, the reported copper concentrations were well below authorized local limits specified by the PVSC for discharge into the PVSC combined sewer system and no evidence of any STC violations of the copper limits in the PVSC discharge permits for the Newark and Kearny Facilities was found in historical records.. The mass of copper attributable to the Newark Facility wastewater was negligible compared to the total mass of copper from all sources in the PVSC system and the copper detected in the wastewater likely originated as the result of corrosion of copper piping/fixtures from contact with the municipal water supplied to the Facility by the City.

Copper concentrations present in the Kearny Facility wastewater were similar to the copper concentrations in the potable water supplied from the City of Kearny. As a result, it is our opinion that the Newark and Kearny Facilities are not a source of copper to the Passaic River.

Dieldrin. Dieldrin a pesticide that is no longer produced or used, but was once used extensively as an insecticide on crops or to control termites (EPA, 2016). STC operated animal rendering processes at the Newark and Kearny Facilities and there is no evidence that dieldrin was used at the facilities, except if de minimis quantities of dieldrin were present in consumer insecticides stored in consumer-sized containers at the facilities. Inspections performed at the Kearny Facility in 1993 and 1995 concluded that dieldrin was not used at the Kearny Facility and dieldrin was not listed in the 1993 and 1994 Community Right To Know Surveys for the Kearny Facility. As a result, it is our opinion that dieldrin would not have been present in wastewater/storm water from the Newark and Kearny Facilities and the facilities are not considered a source of dieldrin to the Passaic River.

- **Polycyclic Aromatic Hydrocarbons (PAHs)**. PAHs are a major component of petroleum products and are formed during incomplete burning of coal, oil, gas, wood or other substances (EPA, 2016). STC operated animal rendering processes at the Newark and Kearny Facilities and did not produce petroleum products (and associated PAHs); however, fuel oil was used to fire the boilers and diesel fuel and other petroleum oils were used to maintain trucks and equipment at both facilities. There is no evidence that petroleum oil was present in significant quantities in wastewater discharged to the PVSC combined sewer from the STC operations and no significant historical oil spills were reported for STC operations at either facility. As a result, it is our opinion that the Newark and Kearny Facilities are not a source of PAHs to the Passaic River.

- **Lead**. Lead occurs naturally in the environment, but most of the higher levels found in the environment come from mining, factories that use lead compounds or releases to the air during the burning of coal, oil or waste (EPA, 2016). STC operated animal rendering processes at the Newark and Kearny Facilities and there is no evidence that lead was used or generated at the facilities. Lead was present at low concentrations in wastewater samples collected from the Newark and Kearny Facilities; however, the reported lead concentrations were well below authorized local limits specified by the PVSC for discharge into the PVSC combined sewer system and no evidence of any STC violations of the lead limits in the PVSC discharge permits for the Newark and Kearny Facilities was found in historical records. The mass of lead attributable to the Newark Facility wastewater was negligible compared to the total mass of lead from all sources in the PVSC system and the lead detected in the wastewater likely originated as the result of corrosion of lead piping/fixtures from contact with the municipal water supplied to the Facility by the City. Lead concentrations present in the Kearny Facility wastewater were similar to the lead concentrations in the potable water supplied from the City of Kearny. As a result, it is our opinion that the Newark and Kearny Facilities are not a source of lead to the Passaic River.

5.1 Historical Passaic River Dredging Operations

As described in Section 2.1 of this report, the Lower Passaic River was dredged numerous times from the 1880s to the early 1980s (USACE, 2010). The objective of the dredging operations was to remove accumulated sediments from the river to increase the depth and width of the federal navigation channel in the waterway. The dredging operations typically affected thousands of feet along the length of the river, removing tens of thousands of tons of sediment during each event.

From approximately 1912 to approximately 1926, the STC Newark Facility (and other industries in the area) may have discharged wastewater directly to the Passaic River; however, the route/path of this discharge could not be identified. As described above, it is our opinion that any lead and copper present in the wastewater discharged from the STC Newark and Kearny Facilities originated as the result of corrosion of lead and copper piping/fixtures from contact with the municipal water supplied to each facility and not process operations. Dredging of the Passaic River near the Newark facility occurred five times during and after this period (1884, 1899, 1906, 1913, 1916, 1921, 1922, and 1937). The dredging projects would have removed accumulated lead and copper from the river along with the dredged sediments and, consequently, there would not be ongoing contributions to the current contamination of the Lower Passaic discussed in the ROD.

6.0 FINDINGS AND CONCLUSIONS

The Lower Passaic River is a 17-mile long tidal stretch of the Passaic River running from Dundee Dam in Passaic County, New Jersey to the confluence of the river with Newark Bay in Essex and Hudson Counties, New Jersey. The Diamond Alkali Superfund Site is located on the Lower Passaic River and Operable Unit 2 (OU2) of the Diamond Alkali Superfund Site addresses contaminated sediments in the lower 8.3 miles of the Lower Passaic River. COCs identified in the Record of Decision for OU2 were Dioxins and Furans, PCBs, mercury, DDT, copper, Dieldrin, PAHs and lead.

Standard Tallow Corporation was identified by EPA as a PRP for OU2 due to historical operations at the Newark and Kearny Facilities which are located in the drainage area of the Lower Passaic River. PBW evaluated the potential contribution of the STC Newark and Kearny Facilities to the contaminants of concern identified for the lower 8.3 miles of the Lower Passaic River in relation to other confirmed/potential sources of contamination in the vicinity. The evaluation concluded the following:

- STC operated an animal rendering plant at the Newark Facility from approximately 1912 until approximately 1986 and an animal rendering plant at the Kearny Facility from approximately 1986 to approximately 1996.

- The Newark and Kearny Facilities processed organic raw materials into tallow and meat and bone meal. Based on historical documents, a batch dry rendering process was operated at the STC Newark Facility from 1912 to approximately 1972 and a continuous dry rendering process was operated from approximately 1972 to 1986. The STC Kearny Facility utilized a continuous dry rendering process throughout its period of operation. No chemicals were used as part of the batch or continuous dry rendering processes and both processes utilized only steam to process the raw materials.

- The Newark and Kearny Facilities were located in the PVSC combined sewer service area. Wastewater generated from the Newark Facility may have been discharged directly to the Passaic River from approximately 1912 until approximately 1926; however, the route/path of this discharge could not be identified. From approximately 1926 until approximately 1986, wastewater was discharged to the PVSC combined sewer system. From approximately 1912 to approximately 1917, the STC Newark operations (and other industries in the area) may have discharged storm water directly to the Passaic River; however, the route/path of this discharge could not be identified. From approximately 1917 forward, storm water was discharged to a separate storm sewer along Blanchard Street prior to entering the river. Wastewater and storm water generated from the Kearny Facility was discharged to the PVSC combined sewer system from approximately 1986 to 1996.

- Discharges to the PVSC combined sewer from the Newark and Kearny Facilities were authorized under PVSC Discharge Permits. The constituents of concern in the wastewater/storm water discharged from the facilities (BOD; COD; animal/vegetable derived fat, oil and grease; nitrogen, etc.) were organic in nature. No evidence of any STC violations of the PVSC discharge permits was found in historical records for either facility.

- It is PBW's opinion that the Newark and Kearny Facilities are not sources for the COCs

identified for the lower 8.3 miles of the Lower Passaic River due to the following:

- Wastewater discharges from current animal rendering facilities similar to the Newark and Kearny Facilities are regulated under the Meat and Poultry Products (MPP) category listed in 40 CFR Part 432 of the NPDES program. Effluent limitations established for the MPP category reflect the organic nature of the raw materials and the absence of chemicals used in the rendering process. None of the effluent parameters regulated under the MPP category are identified in the list of COCs identified for the lower 8.3 miles of the Lower Passaic River.

- Storm water discharges from current animal rendering facilities similar to the Newark and Kearny Facilities are regulated under Sector U – Food and Kindred Products of the NPDES Multi-Sector General Permit (MSGP) for Storm Water Discharges associated with Industrial Activity. The MSGP includes benchmark storm water sampling for constituents that reflect the organic nature of the raw materials and the absence of chemicals used in the rendering process. None of the benchmark storm water sampling parameters included for Sector U facilities in the MSGP are identified in the list of COCs identified for the lower 8.3 miles of the Lower Passaic River.

- Darling is the largest independent animal by-product recycling company in North America and operates over 120 animal rendering plants in the United States and Canada. Nearly all of these facilities are authorized to discharge wastewater from the rendering process to municipal sewer systems, land application areas or surface waters under permits issued by the EPA or state environmental agencies. The permits require Darling to regularly monitor the wastewater discharges for constituents that reflect the organic nature of the raw materials and the absence of chemicals used in the rendering process. None of the parameters typically monitored by Darling at its facilities are identified in the list of COCs identified for the lower 8.3 miles of the Lower Passaic River.

- Dioxins and Furans. Dioxins and furans are by-products of chemical manufacturing, combustion, metal processing and paper manufacturing and dioxin was a by-product of the manufacture of the defoliant Agent Orange and other herbicides at the Diamond Alkali facility. There is no evidence that dioxins and furans or related herbicides were used or generated at the Newark and Kearny Facilities.

- PCBs. PCBs were used widely as coolants and oils, and in the manufacture of paints, caulking and building material prior to being banned in the 1970s. Electrical and hydraulic equipment operated at the Newark Facility may have used coolants/oils containing PCBs based on the dates the facility was in operation; however, there is no evidence of any spills, releases or discharges of PCB-containing oils from the facility. This is no evidence that PCBs were used at the Kearny Facility.

- Mercury. Mercury is released to the environment through a variety of processes, including metals processing, burning of coal, improper disposal of medical and other wastes, industrial effluent discharge, and atmospheric deposition. There is no evidence that mercury was used or generated at the Newark and Kearny Facilities and mercury was not detected in wastewater samples collected from the Newark and Kearny Facilities.

- DDT. DDT is a pesticide that was used to control insects on crops and mosquitoes that spread malaria and was banned for use in the United States in 1972. There is no evidence that DDT was used at the Newark and Kearny Facilities, except if de minimis quantities of DDT were present in consumer insecticides used/stored in consumer-sized containers at the facilities.

- Copper. Copper enters the environment through releases from factories that make or use copper metal or compounds, leachate from landfills, combustion of fossil fuels, wood processing, fertilizer production and from natural sources such as dust from soils, volcanoes and forest fires. There is no evidence that copper was used or generated at the facilities. Copper was present at low concentrations in wastewater samples collected from the Newark and Kearny Facilities; however, the reported copper concentrations were well below local limits specified by the PVSC for discharge into the PVSC combined sewer system. The mass of copper attributable to the Newark Facility wastewater was negligible compared to the total mass of copper from all sources in the PVSC system and the copper detected in the wastewater likely originated as the result of corrosion of copper piping/fixtures from contact with the municipal water supplied to the Facility by the City. Copper concentrations present in the Kearny Facility wastewater were similar to the copper concentrations in the potable water supplied from the City of Kearny.

- Dieldrin. Dieldrin a pesticide that is no longer produced or used, but was once used extensively as an insecticide on crops or to control termites. STC operated animal rendering processes at the Newark and Kearny Facilities and there is no evidence that dieldrin was used at the facilities, except if de minimis quantities of dieldrin were present in consumer insecticides stored in consumer-sized containers at the facilities.

- PAHs. PAHs are a major component of petroleum products and are formed during incomplete burning of coal, oil, gas, wood or other substances. Fuel oil was used to fire boilers and diesel fuel and other petroleum oils were used to maintain trucks and equipment at the Newark and Kearny Facilities; however, there is no evidence that petroleum oil was present in wastewater discharged from the Newark and Kearny Facilities and no historical oil spills were reported for STC operations at either facility.

- Lead. Lead occurs naturally in the environment, but most of the higher levels found in the environment come from mining, factories that use lead compounds or releases to the air during the burning of coal, oil or waste. There is no evidence that lead was used or generated at the Newark and Kearny Facilities. Lead was present at low concentrations in wastewater samples collected from the Newark and Kearny Facilities; however, the reported lead concentrations were well below local limits specified by the PVSC for discharge into the PVSC combined sewer system. The mass of lead attributable to the Newark Facility wastewater was negligible compared to the total mass of lead from all sources in the PVSC system and the lead detected in the wastewater likely originated as the result of corrosion of lead piping/fixtures from contact with the municipal water supplied to the Facility by the City. Lead concentrations present in the Kearny Facility wastewater were similar to the lead concentrations in the potable water supplied from the City of Kearny.

- As described above, it is our opinion that any lead and copper present in the wastewater discharged from the STC Newark and Kearny Facilities originated as the result of corrosion of lead and copper piping/fixtures from contact with the municipal water supplied to each facility. However, even if some small amounts of lead and copper were discharged in the wastewater from the Newark Facility to the river from 1912 to 1926 (when the STC Newark Facility and other industries in the area may have discharged wastewater directly to the Passaic River), dredging of the Passaic River near the Newark facility occurred five times during and after this period (, 1913, 1916, 1921, 1922, and 1937). The dredging projects would have removed the majority of any accumulated lead and copper from the river along with the dredged sediments and, consequently, there would not be ongoing contributions to the current contamination of the Lower Passaic discussed in the ROD.

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TABLES

Table 1

Standard Tallow Corporation
61 Blanchard Street - Newark, New Jersey
Copper, Lead and Mercury in Wastewater

Metal	Standard Tallow Coporation Wastewater		PVSC POTW Influent Mass 1978-1980 (lb/day)	Standard Tallow Percentage of PVSC POTW Influent Mass (percent)
	Concentration (mg/L)	Mass (lb/day)		
Copper	0.192	0.058	1,210	0.0048
Lead	0.179	0.054	2,060	0.0026
Mercury	ND	ND	117.4	None

Notes:

1) Standard Tallow data from Heavy Metals Source Determination Study - Elson T. Killam Associates, Inc., August 15, 1978
2) PVSC POTW Influent data from Passaic Valley Sewerage Commissioners - Pretreatment Program Annual Report No. 4 - September 18, 1987
3) ND = metal not detected in Standard Tallow Wastewater

Table 2

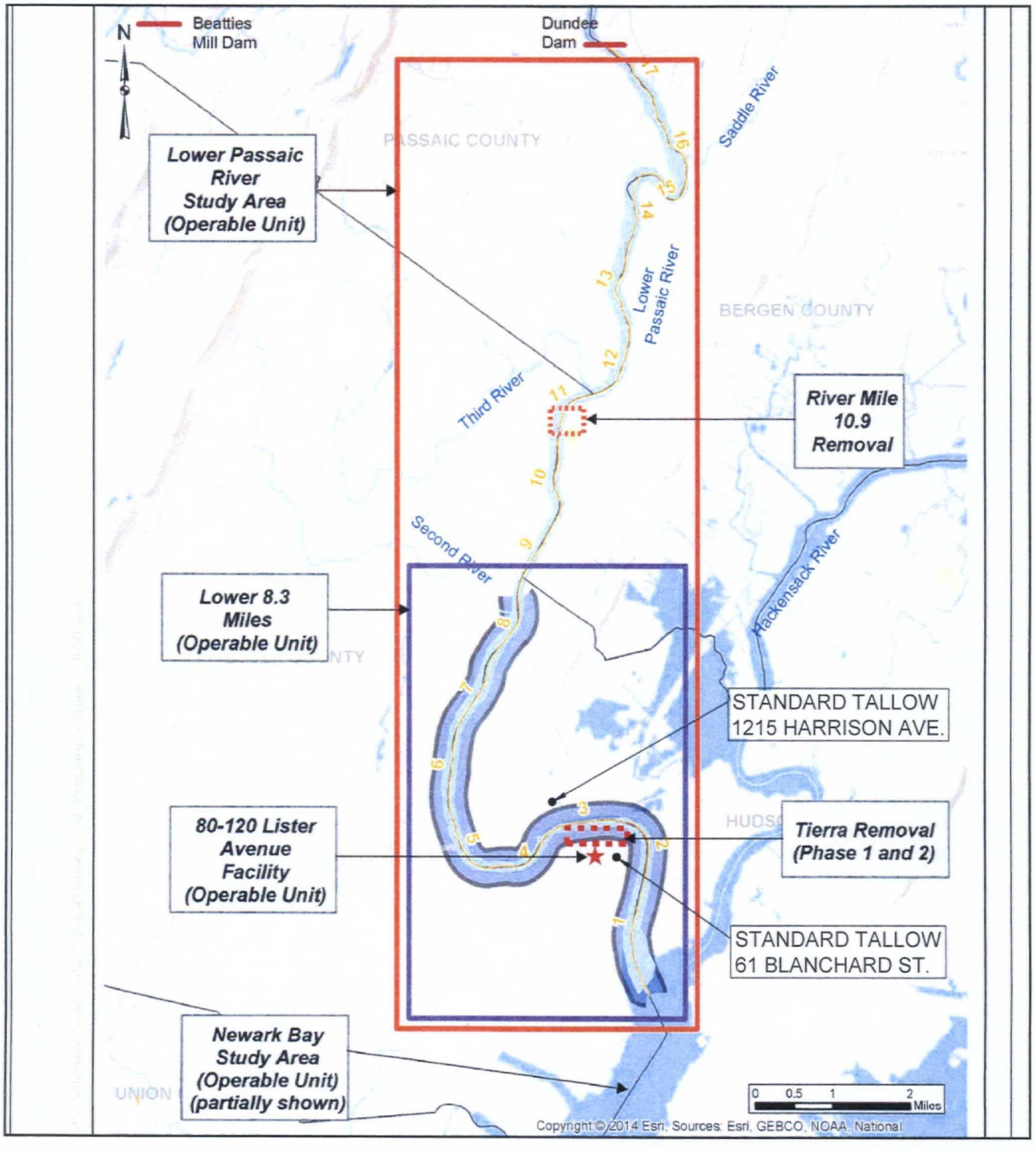
Standard Tallow Corporation
1215 Harrison Avenue - Kearny, New Jersey
Copper, Lead and Mercury in Wastewater

Metal	Standard Tallow Wastewater			PVSC Threshold Value (mg/L)	PVSC Local Limit (mg/L)
	Sample Date	Concentration (mg/L)	Average Conc. (mg/L)		
Copper	11/1/1994	0.040	0.030	0.092	3.02
	11/8/1994	<0.01			
	11/15/1994	0.040			
Lead	11/1/1994	0.007	0.0073	0.029	0.54
	11/8/1994	0.007			
	11/15/1994	0.008			
Mercury	11/1/1994	<0.00009	<0.0009	0.001	0.08
	11/8/1994	<0.00009			
	11/15/1994	<0.00009			

Notes:

1) Standard Tallow data from Local Limit Baseline Monitoring Report - The Sullivan Engineering Group, Inc., Revised May 1995
2) PVSC Threshold Value = If analytical result exceeds value, regular monitoring is required
3) PVSC Local Limit = If analytical result exceeds value, violation of the PVSC Rules and Regulations Concerning Discharges to the PVSC POTW
4) Threshold Values and Local Limits shown in table are from Local Limit Baseline Monitoring Report The Sullivan Engineering Group, Inc., Revised May 1995

FIGURES



EXPLANATION

3 River Mile

Lower Passaic River Study Area

N

Scale in Feet

0 5,000 10,000

Source:
Record of Decision - Lower 8.3 Miles of The Lower Passaic River.
Part of the Diamond Ackali Superfund Site, USEPA, March 3, 2016.

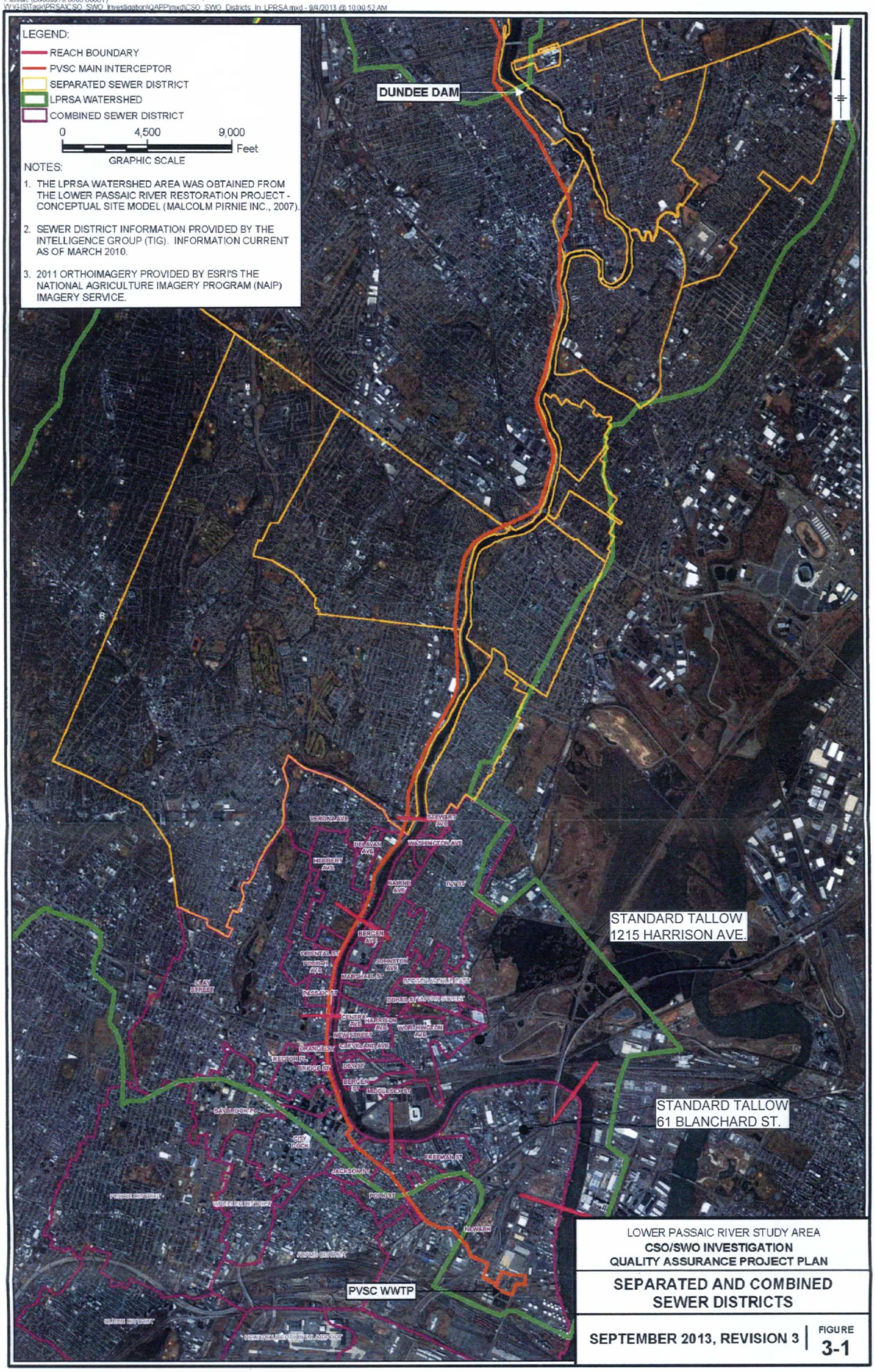
DARLING INGREDIENTS INC.
LOWER PASSAIC RIVER - OU2
DIAMOND ACKALI SUPERFUND SITE

Figure 1

SITE LOCATION MAP

PROJECT: 5242	BY: ADJ	REVISIONS
DATE: JUNE, 2016	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS



LOWER PASSAIC RIVER STUDY AREA
CSO/SWO INVESTIGATION
QUALITY ASSURANCE PROJECT PLAN

SEPARATED AND COMBINED SEWER DISTRICTS

SEPTEMBER 2013, REVISION 3 | FIGURE **3-1**

N

Scale in Feet
0 2,250 5,500

Source:
Combined Sewer Overflow/Stormwater OUtfall Investigation Quality Assurance Project Plan, Lower Passaic River Study Area, Tierra Solutions, Inc. September 2013.

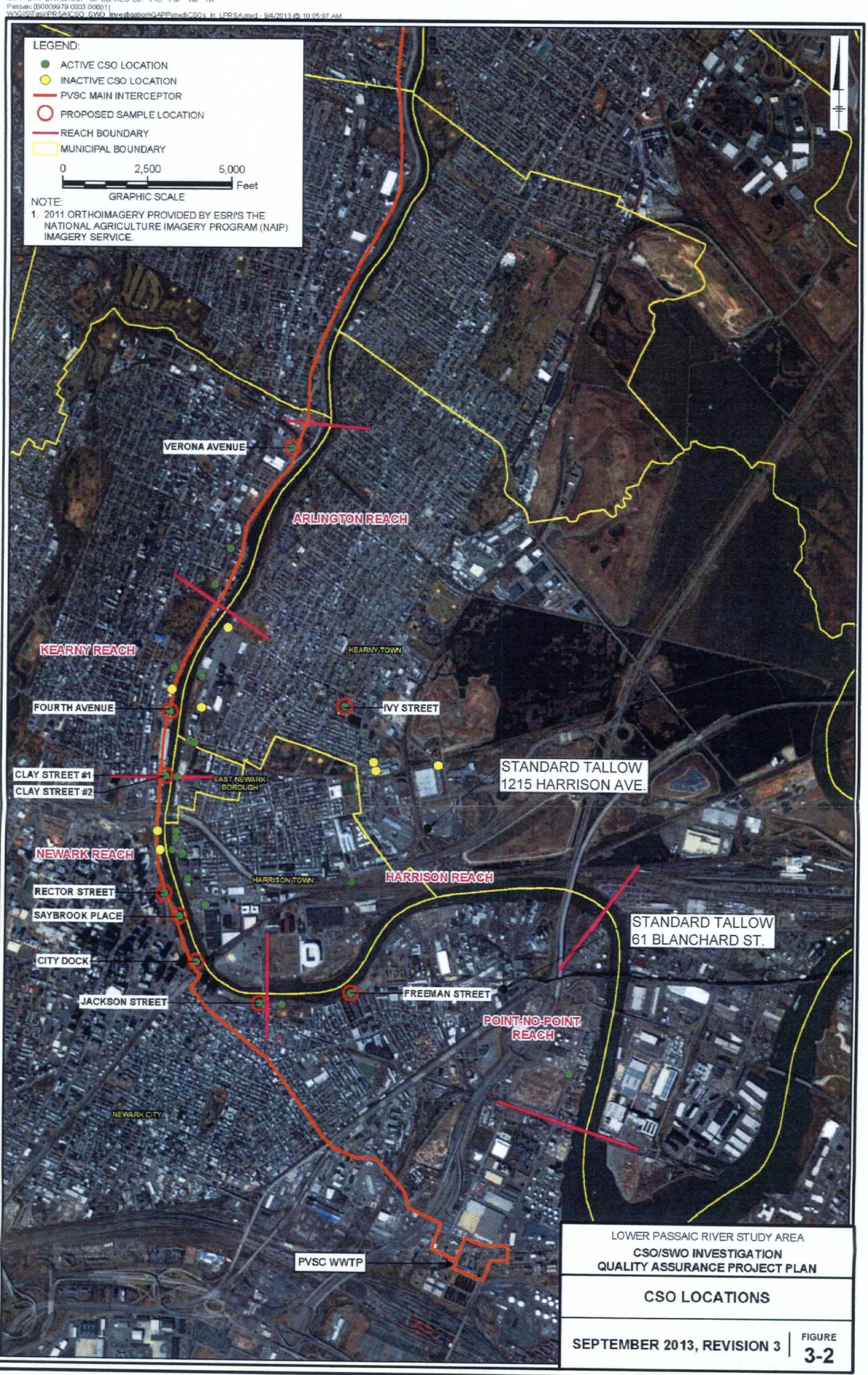
DARLING INGREDIENTS INC.
LOWER PASSAIC RIVER - OU2
DIAMOND ACKALI SUPERFUND SITE

Figure 2

PVSC COMBINED SEWER SYSTEM MAP

PROJECT: 1789	BY: ADJ	REVISIONS
DATE: JUNE, 2016	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS



LOWER PASSAIC RIVER STUDY AREA
CSO/SWO INVESTIGATION
QUALITY ASSURANCE PROJECT PLAN

CSO LOCATIONS

SEPTEMBER 2013, REVISION 3 | FIGURE **3-2**

Source:
Combined Sewer Overflow/Stormwater OUtfall Investigation Quality Assurance Project Plan, Lower Passaic River Study Area, Tierra Solutions, Inc. September 2013.

N

Scale in Feet
0 1,500 3,000

DARLING INGREDIENTS INC.
LOWER PASSAIC RIVER - OU2
DIAMOND ACKALI SUPERFUND SITE

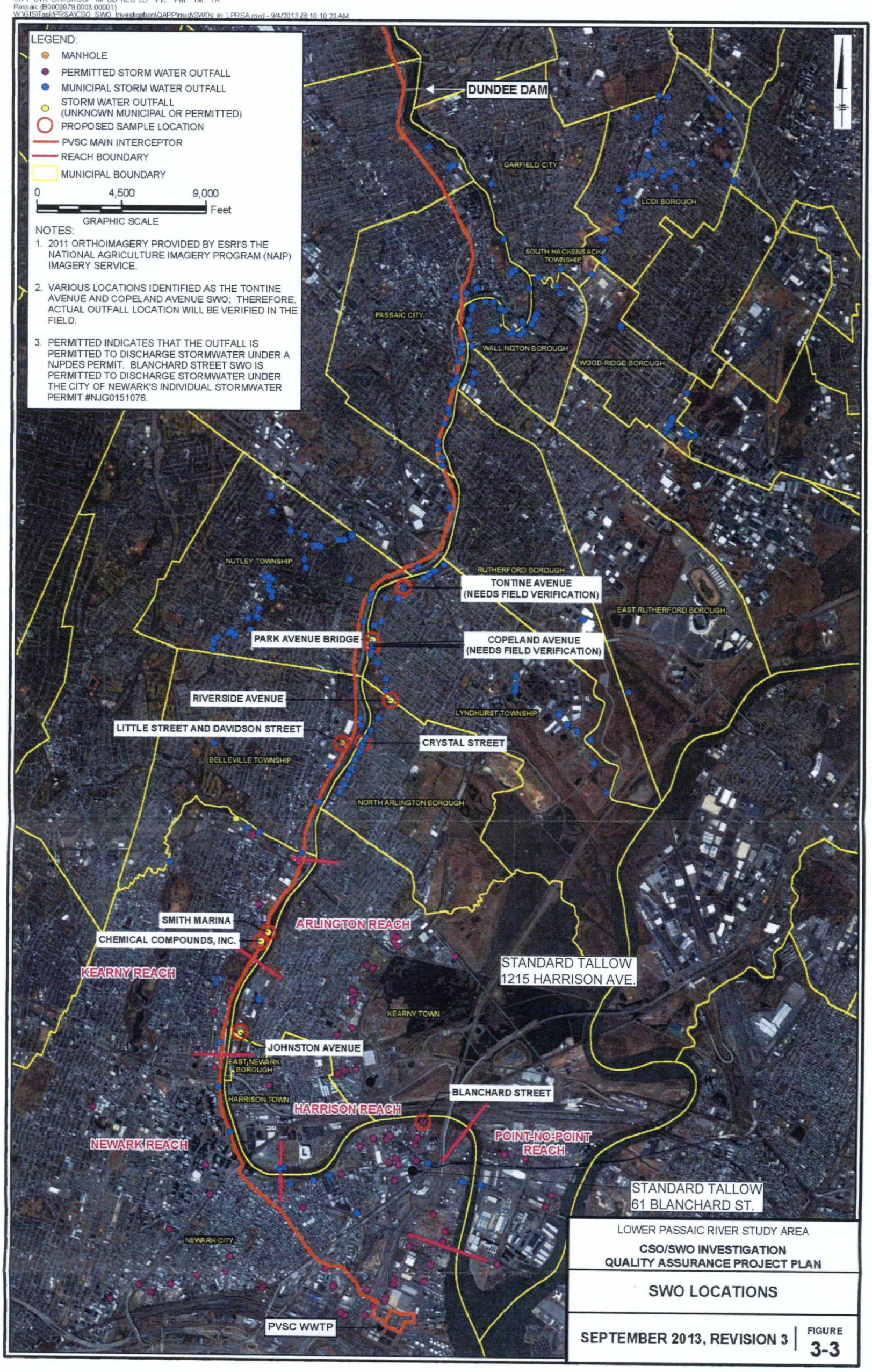
Figure 3

PVSC CSO LOCATIONS

PROJECT: 1789	BY: ADJ	REVISIONS
DATE: JULY, 2016	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS

CITY: SYR DIV/GROUP: IM DB: KES LD: PIC: PM: TM: TR:
Passaic (B0009979.0003.00001)
W:\GIS\Task\PRSA\CSO_SWO_Investigation\QAPP\mxd\SWOs_in_LPRSA.mxd - 9/4/2013 @ 10:10:23 AM



LOWER PASSAIC RIVER STUDY AREA
CSO/SWO INVESTIGATION QUALITY ASSURANCE PROJECT PLAN

SWO LOCATIONS

SEPTEMBER 2013, REVISION 3 | FIGURE **3-3**

Source:
Combined Sewer Overflow/Stormwater OUtfall Investigation Quality Assurance Project Plan, Lower Passaic River Study Area, Tierra Solutions, Inc. September 2013.

N

Scale in Feet
0 2,250 5,500

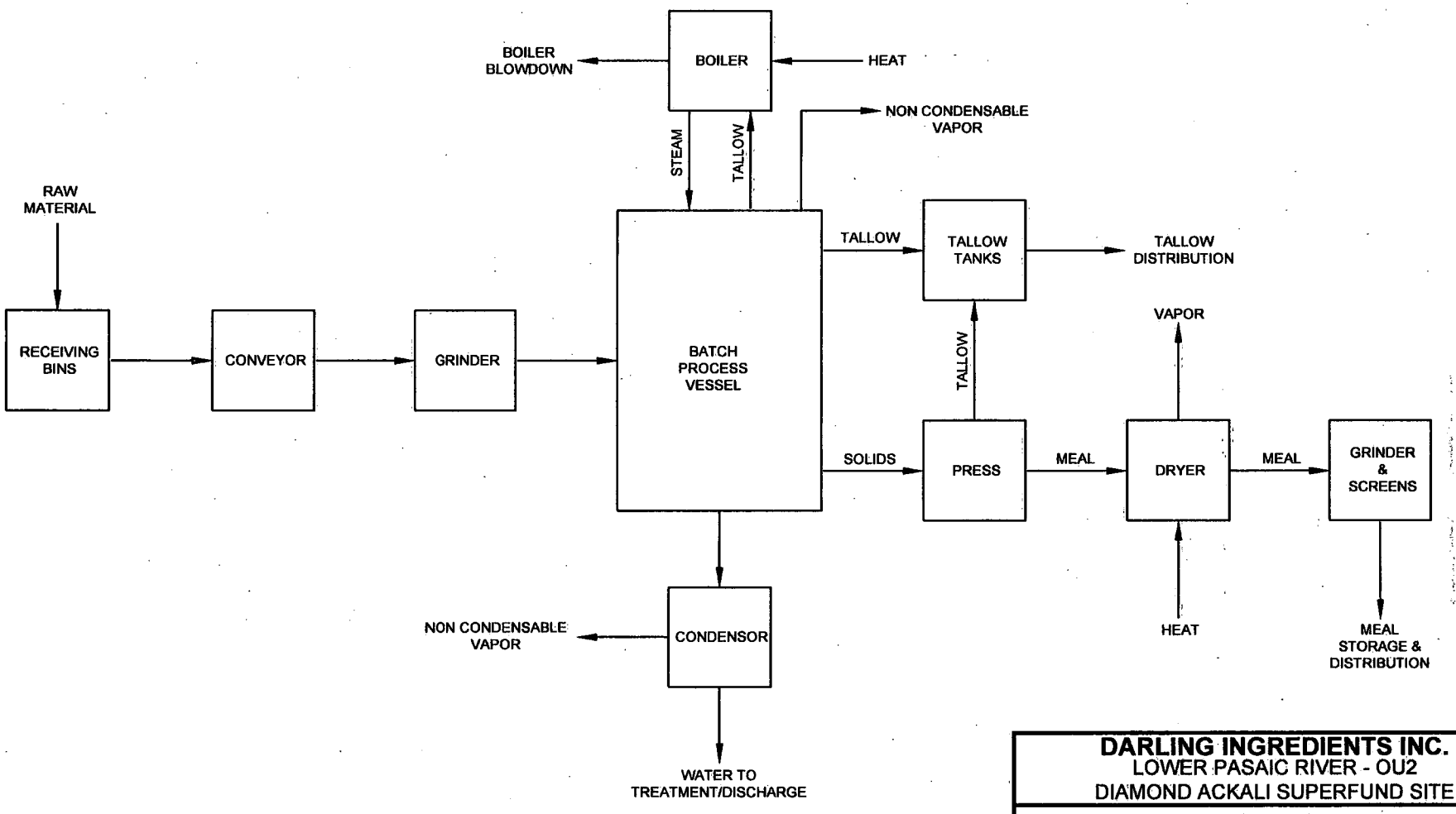
DARLING INGREDIENTS INC.
LOWER PASSAIC RIVER - OU2
DIAMOND ACKALI SUPERFUND SITE

Figure 4

PVSC SWO LOCATIONS

PROJECT: 1789	BY: ADJ	REVISIONS
DATE: JULY, 2016	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS



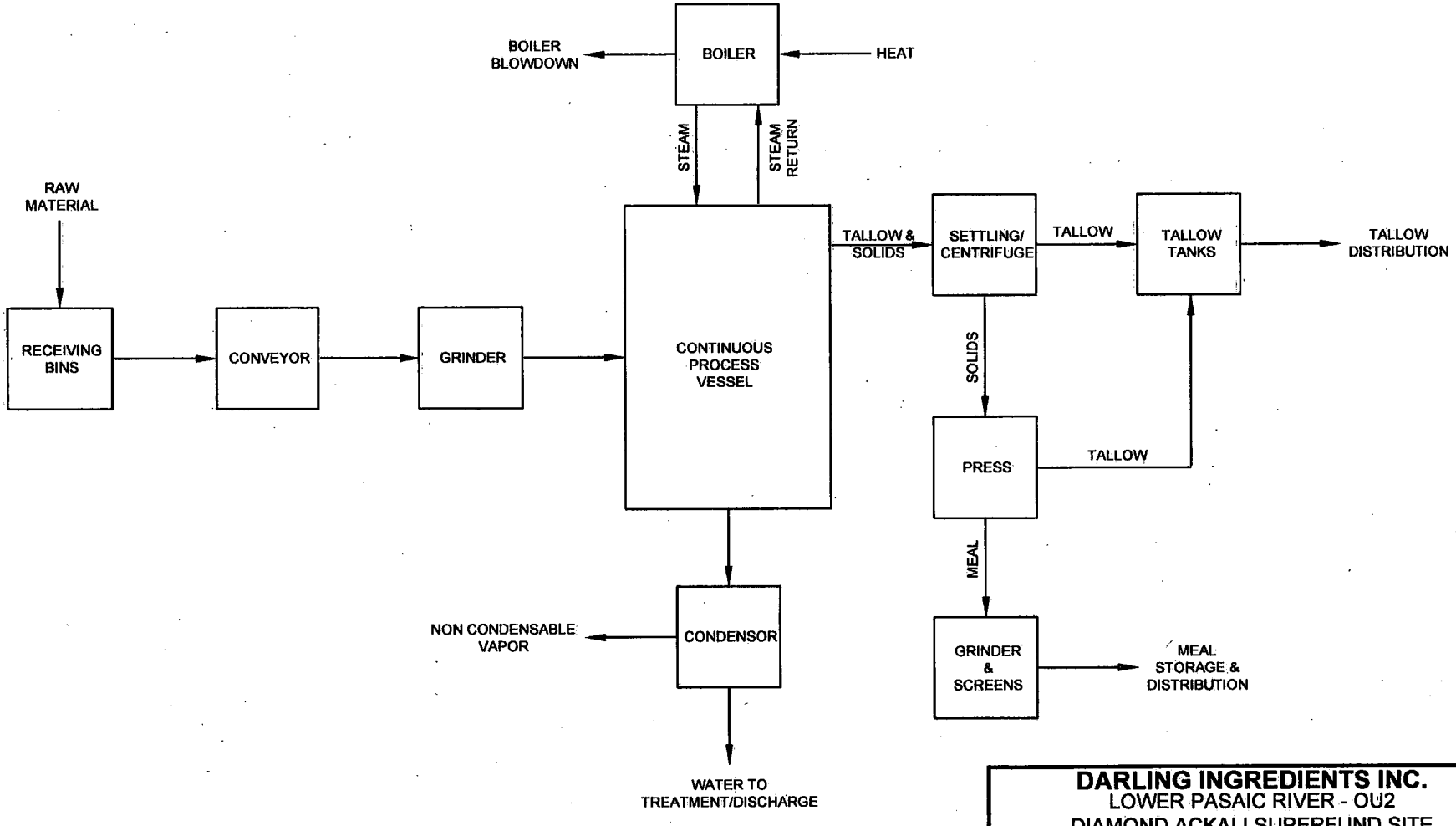
DARLING INGREDIENTS INC.
LOWER PASAIC RIVER - OU2
DIAMOND ACKALI SUPERFUND SITE

Figure 5

SIMPLIFIED BATCH DRY RENDERING PROCESS SCHEMATIC

PROJECT: 1789	BY: ADJ	REVISIONS
DATE: JULY, 2016	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS



DARLING INGREDIENTS INC.
LOWER PASAIC RIVER - OU2
DIAMOND ACKALI SUPERFUND SITE

Figure 6

SIMPLIFIED CONTINUOUS DRY RENDERING PROCESS SCHEMATIC

PROJECT: 1789	BY: ADJ	REVISIONS
DATE: JULY, 2016	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS

APPENDIX A

CONTAMINANTS OF CONCERN IN LOWER 8.3 MILES OF THE LOWER PASSAIC RIVER

Table 1
Contaminants of Concern in Surface Sediments (top 6 inches)

Surface Sediments, 0-6 inches [a]	Unit [b]	Frequency of Detection	Minimum	Maximum	Mean	Median
2,3,7,8-TCDD [c]	pg/g	370/372	0.09	34,100	1,000	280
Total TCDD	pg/g	318/319	2.20	37,900	1,300	400
Total PCBs	ug/kg	364/365	0.10	28,600	1,700	1,000
Total DDT	ug/kg	368/368	0.32	10,200	240	99
Dieldrin	ug/kg	276/362	0.01	150	11	5.20
Total PAHs	mg/kg	368/368	0.21	2,810	47	31
Mercury	mg/kg	380/388	0.05	24	2.75	2.20
Copper	mg/kg	380/382	0.21	2,470	183	170
Lead	mg/kg	375/375	4.40	906	260	235

Notes
Based on 1995 – 2013 data.

[a] The top six inches of sediment is where most organisms in contact with the sediment are exposed to COCs, because it is where they are most active (e.g., burrowing or feeding).

[b] pg/g = picograms per gram or parts per trillion (ppt);
ug/kg = micrograms per kilogram or parts per billion (ppb);
mg/kg = milligrams per kilogram or parts per million (ppm).

[c] 2,3,7,8-TCDD = 2,3,7,8-tetrachlorodibenzo-p-dioxin is the most toxic form of dioxin.

Table 2
Contaminants of Concern in Sediment below 6 Inches

Contaminant Concentrations in Sediment with Depth	0.5 - 1.5 feet		1.5 - 2.5 feet		2.5 - 3.5 feet		3.5 feet – end*	
	Min-Max	Mean (Median)	Min-Max	Mean (Median)	Min-Max	Mean (Median)	Min-Max	Mean (Median)
2,3,7,8-TCDD (pg/g or ppt)	0.13 – 50,400	2,000 (400)	0.10 – 77,900	3,530 (520)	0.09 – 932,000	9,700 (450)	0.07 – 5,300,000	19,200 (270)
Total TCDD (pg/g or ppt)	0.032 – 27,700	1,980 (500)	0.11 – 60,200	3,320 (610)	0.021 – 67,900	3,600 (580)	0.021 – 2,760,000	12,400 (370)
Total PCBs (ug/kg or ppb)	0.02 – 33,000	2,870 (1,560)	0.02 – 41,800	3,510 (1,810)	0.0062 – 29,960	3,970 (1,590)	0.00059 – 133,000	3,350 (930)
Total DDT (ug/kg or ppb)	0.024 – 4,600	240 (120)	0.02 – 30,800	580 (130)	0.02 – 7,800	450 (180)	0.0038 – 14,000,000	29,200 (120)
Dieldrin (ug/kg or ppb)	0.007 - 250	14 (3.5)	0.024 - 250	16 (3.8)	0.0014 - 580	25 (3.9)	0.0016 – 1,000	27 (3.0)
Total PAHs (mg/kg or ppm)	0.006 – 6,500	72 (30)	0.0013 – 7,750	140 (31)	0.0011 - 720	45 (29)	0.00032 – 1,270	64 (33)
Mercury (mg/kg or ppm)	0.0034 - 28	4.6 (3.6)	0.005 - 29	5.8 (4.3)	0.0074 - 28	5.8 (4.7)	0.0016 – 30	6.5 (5.4)
Copper (mg/kg or ppm)	1.5 – 3,020	270 (210)	3.4 – 1,210	290 (250)	2.3 – 1,040	280 (280)	2.1 – 4,700	330 (310)
Lead (mg/kg or ppm)	1.9 – 17,900	460 (340)	1.7 – 1,100	420 (400)	1.7 – 980	410 (420)	1.0 – 7,860	430 (460)

Notes
Based on 1990-2013 data
* Depth of cores is highly variable, but averages about 12 to 20 feet.

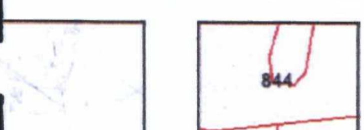
APPENDIX B

NEWARK FACILITY - SANBORN MAPS

2003 Certified Sanborn Map

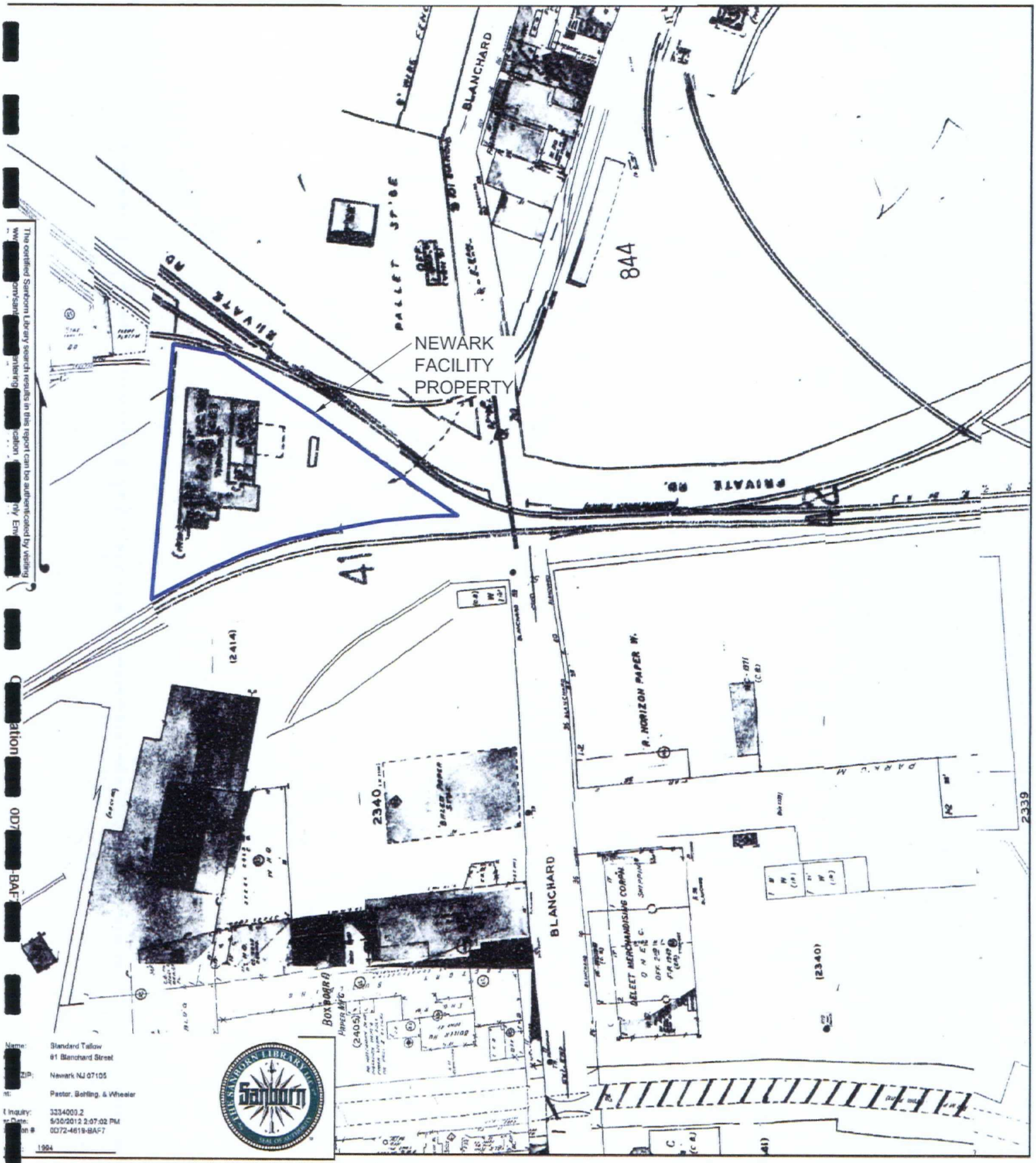
0 Feet 150 300 600

This Certified Sanborn Map combines the following sheets.
Outlined areas indicate map sheets within the collection.



Volume 8, Sheet 841
Volume 8, Sheet 842
Volume 8, Sheet 844

1994 Certified Sanborn Map



This Certified Sanborn Map combines the following sheets.
Outlined areas indicate map sheets within the collection.

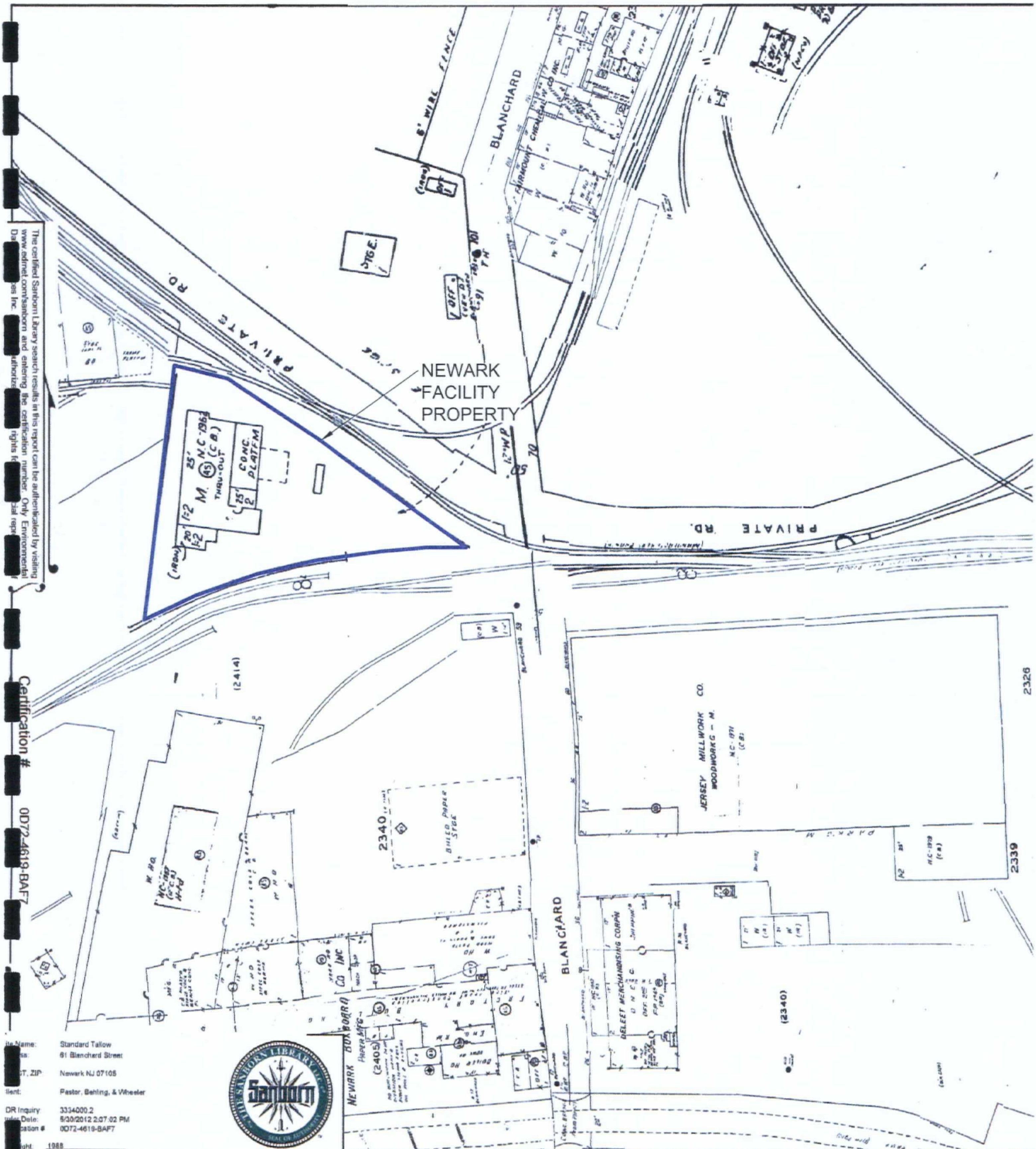
0 Feet 150 300 600

Volume 8, Sheet 841
Volume 8, Sheet 842
Volume 8, Sheet 844
Volume 8, Sheet 841

Volume 8, Sheet 844

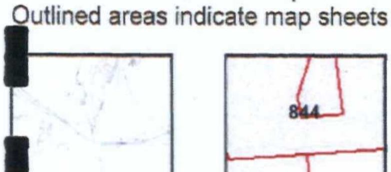
N

1988 Certified Sanborn Map



This Certified Sanborn Map combines the following sheets.
Outlined areas indicate map sheets within the collection.

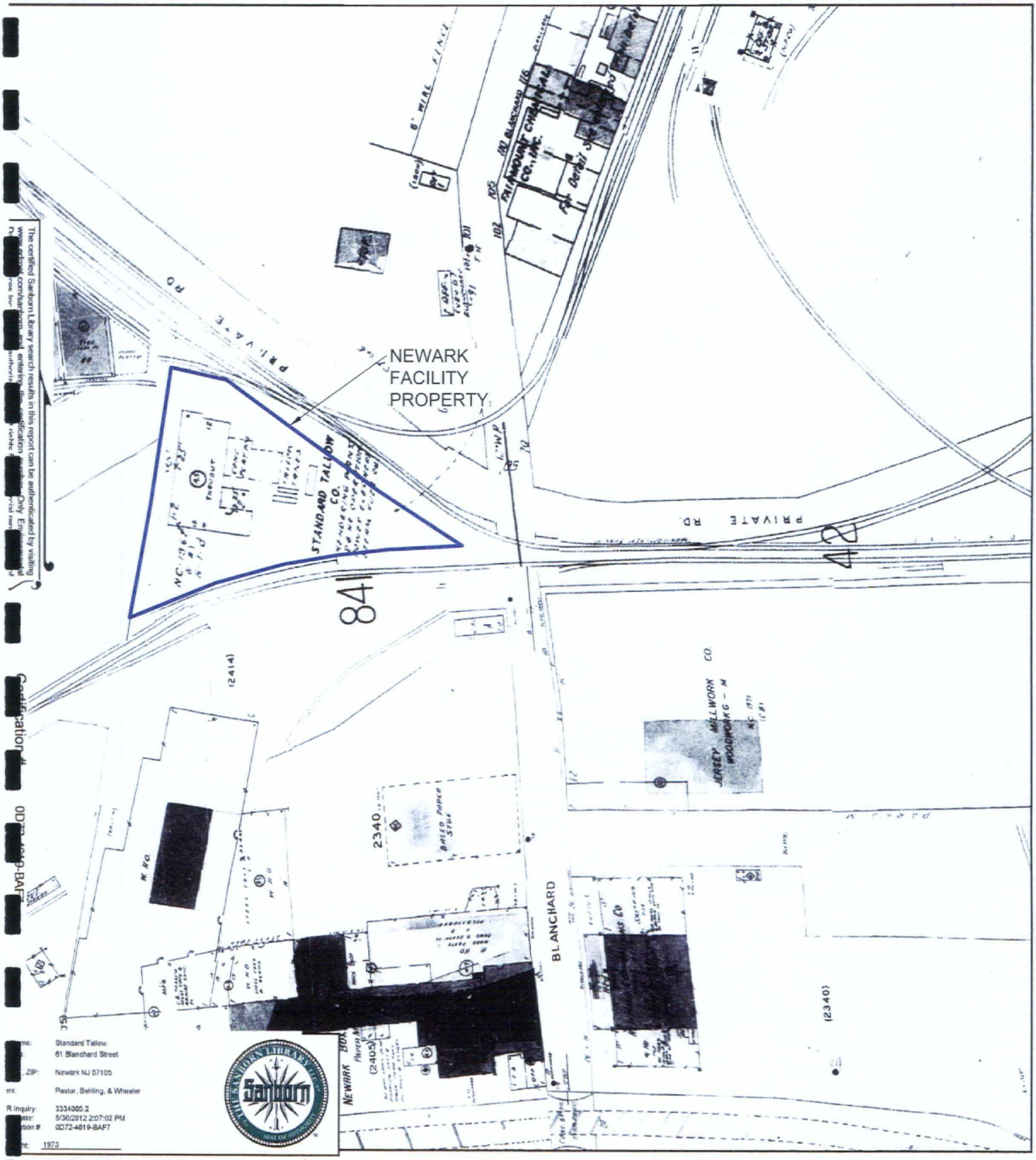
0 Feet 150 300 600



Volume 8, Sheet 841
Volume 8, Sheet 842
Volume 8, Sheet 844

N

1973 Certified Sanborn Map



Name:	Standard Tallow
Address:	61 Blanchard Street
City, ZIP:	Newark NJ 07105
Client:	Pastor, Behling, & Wheeler
EDR Inquiry:	3334000.2
Date:	5/30/2012 2:07:02 PM
Certification #:	0D72-4819-BAF7
Print:	1973

This Certified Sanborn Map combines the following sheets.
Outlined areas indicate map sheets within the collection.

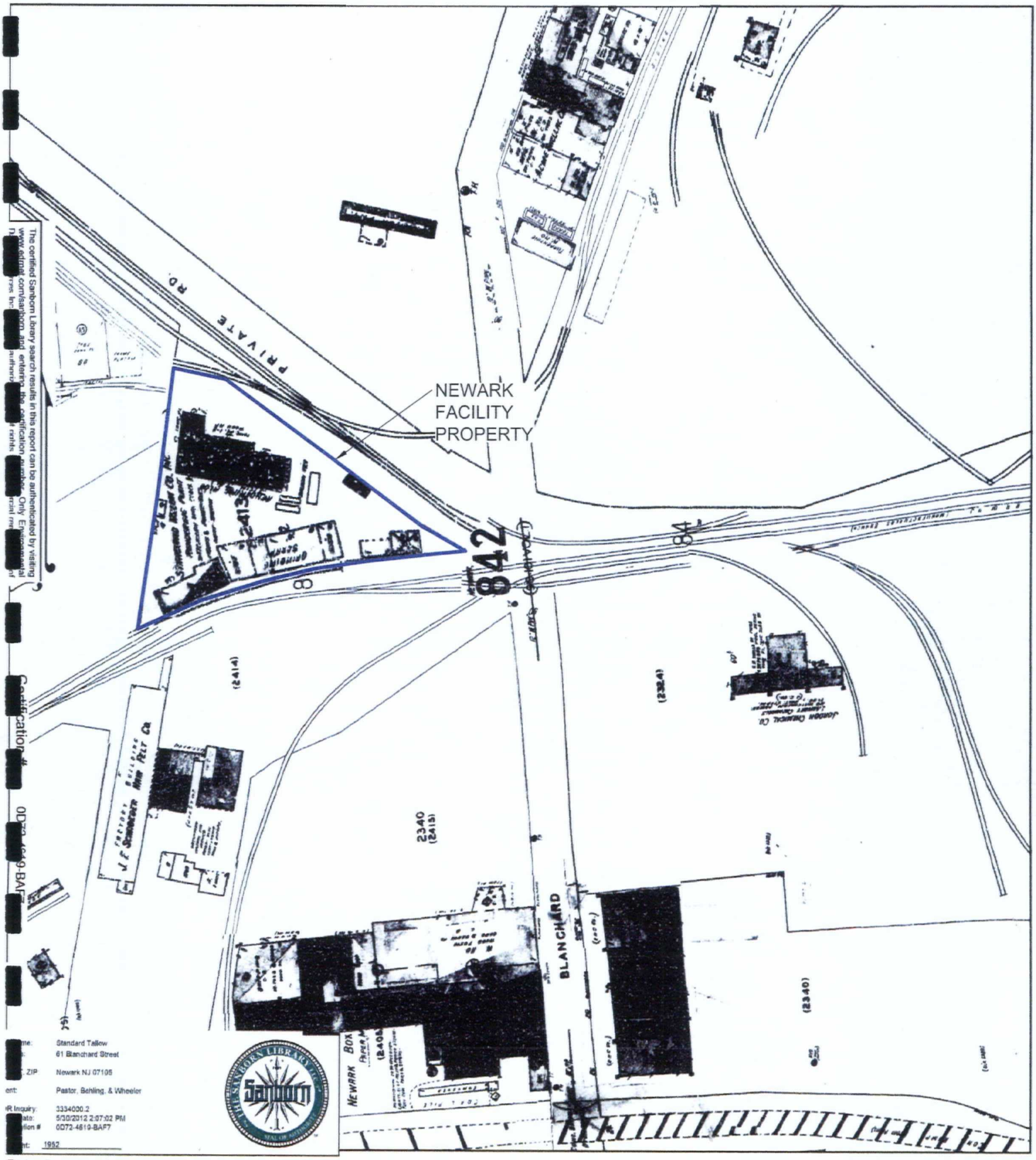
844

Volume 8, Sheet 841
Volume 8, Sheet 842
Volume 8, Sheet 844

0 Feet 150 300 600

N

1952 Certified Sanborn Map

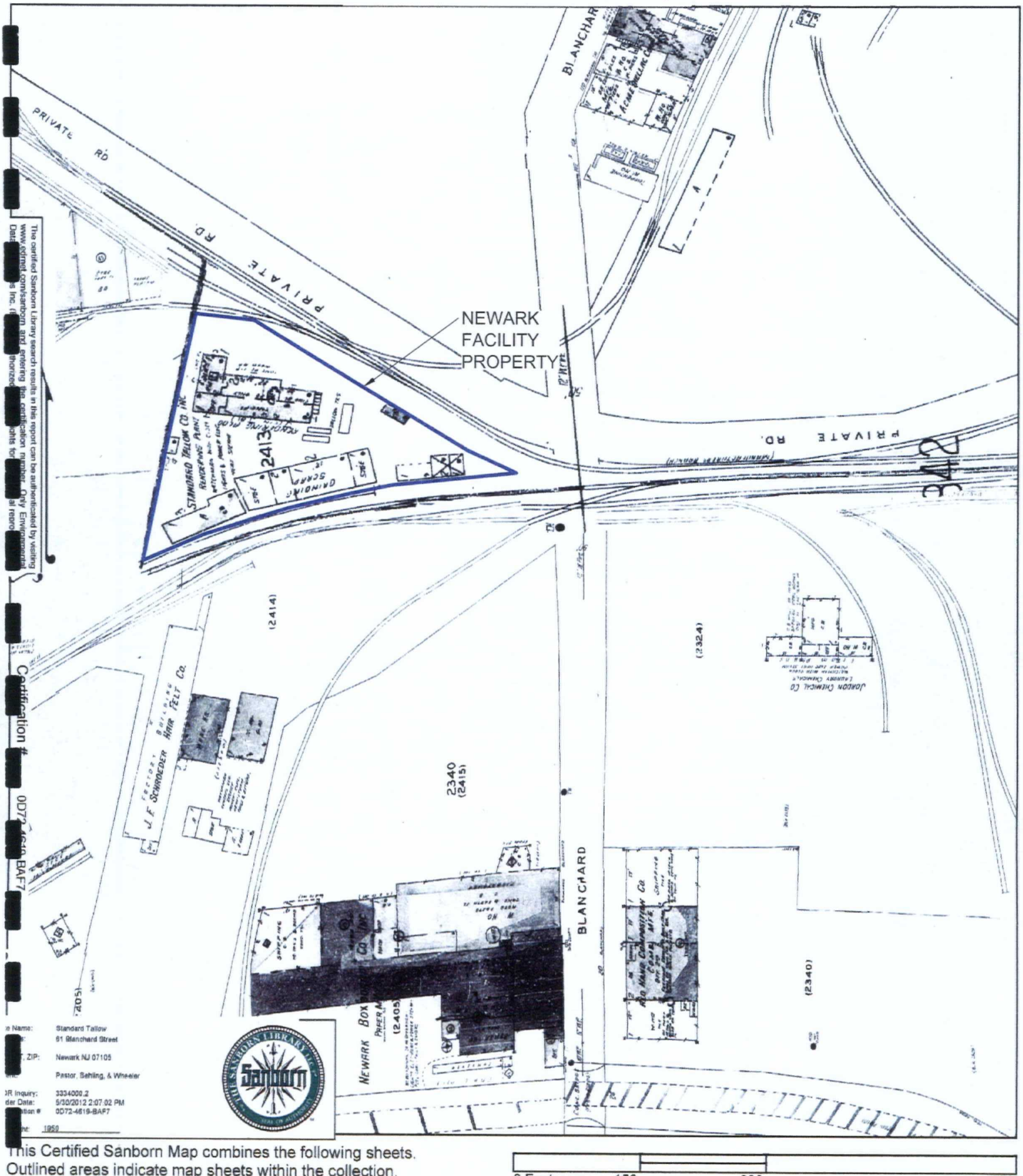


This Certified Sanborn Map combines the following sheets.
Outlined areas indicate map sheets within the collection.

0 Feet 150 300 600

Volume 8, Sheet 841
Volume 8, Sheet 842
Volume 8, Sheet 844

1950 Certified Sanborn Map



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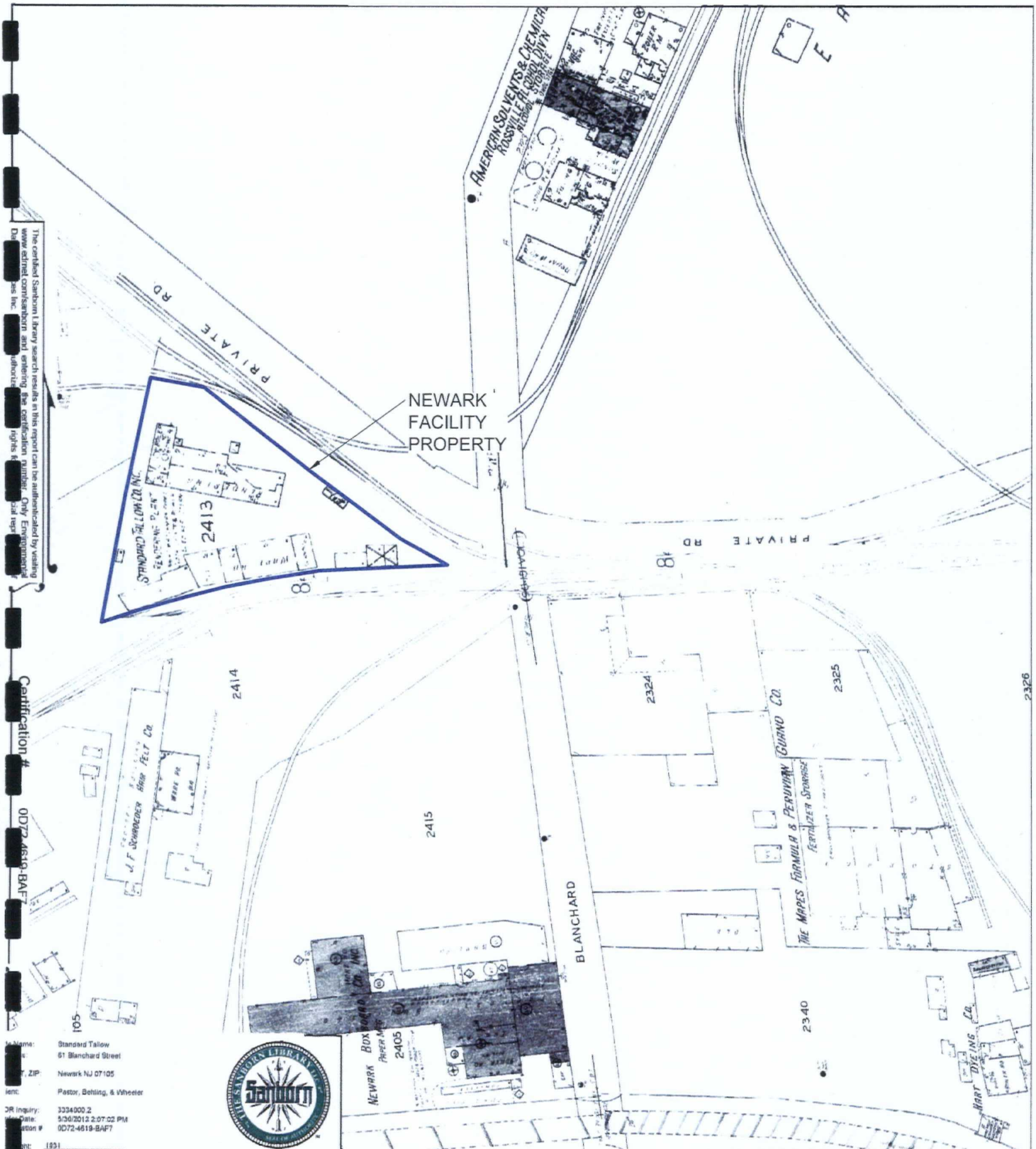
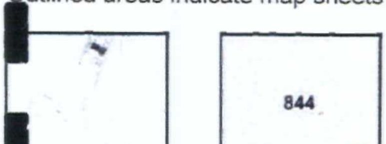
Outlined areas indicate map sheets within the collection.

Volume 8, Sheet 841
Volume 8, Sheet 842
Volume 8, Sheet 844

1931 Certified Sanborn Map



This Certified Sanborn Map combines the following sheets.
Outlined areas indicate map sheets within the collection.



Volume 8, Sheet 841
Volume 8, Sheet 842
Volume 8, Sheet 844

0 Feet 150 300 600

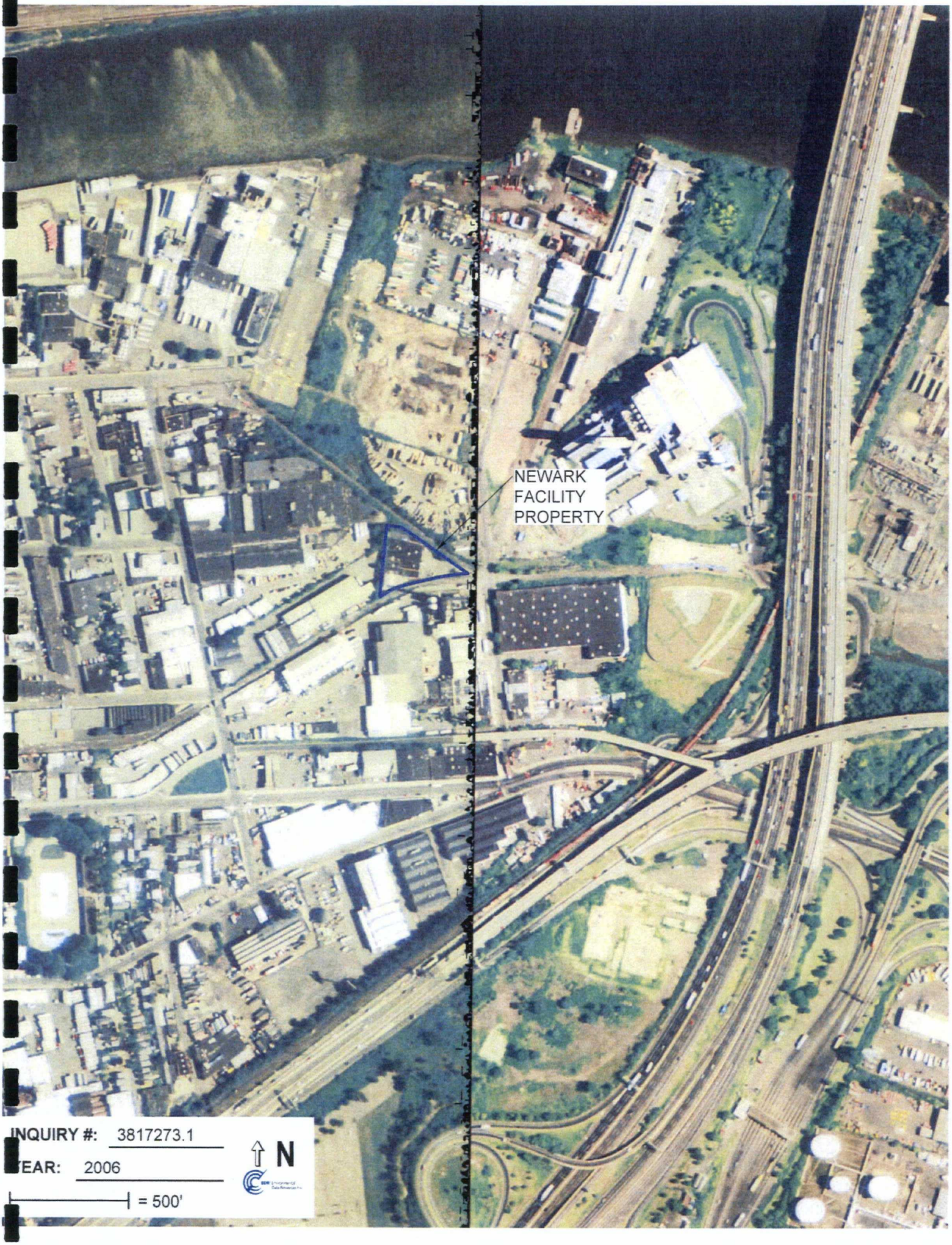
N

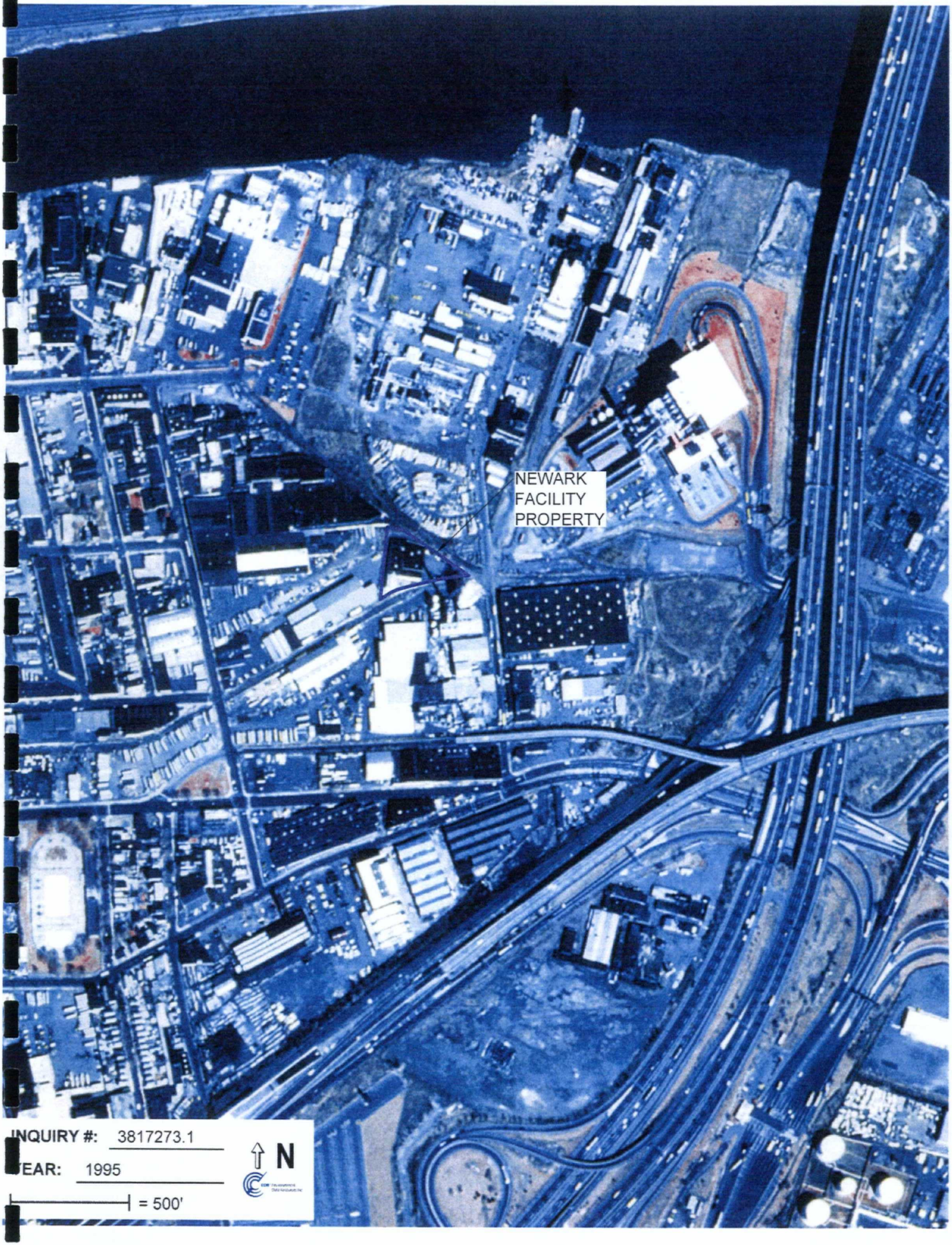
APPENDIX C

NEWARK FACILITY – HISTORICAL AERIAL PHOTOGRAPHS


NEWARK
FACILITY
PROPERTY
INQUIRY #: 3817273.1
YEAR: 2010
= 500'
N


NEWARK
FACILITY
PROPERTY
INQUIRY #: 3817273.1
YEAR: 2008
= 500'
N


NEWARK
FACILITY
PROPERTY
INQUIRY #: 3817273.1
YEAR: 2006
= 500'
N


NEWARK
FACILITY
PROPERTY
INQUIRY #: 3817273.1
YEAR: 1995
= 500'
N

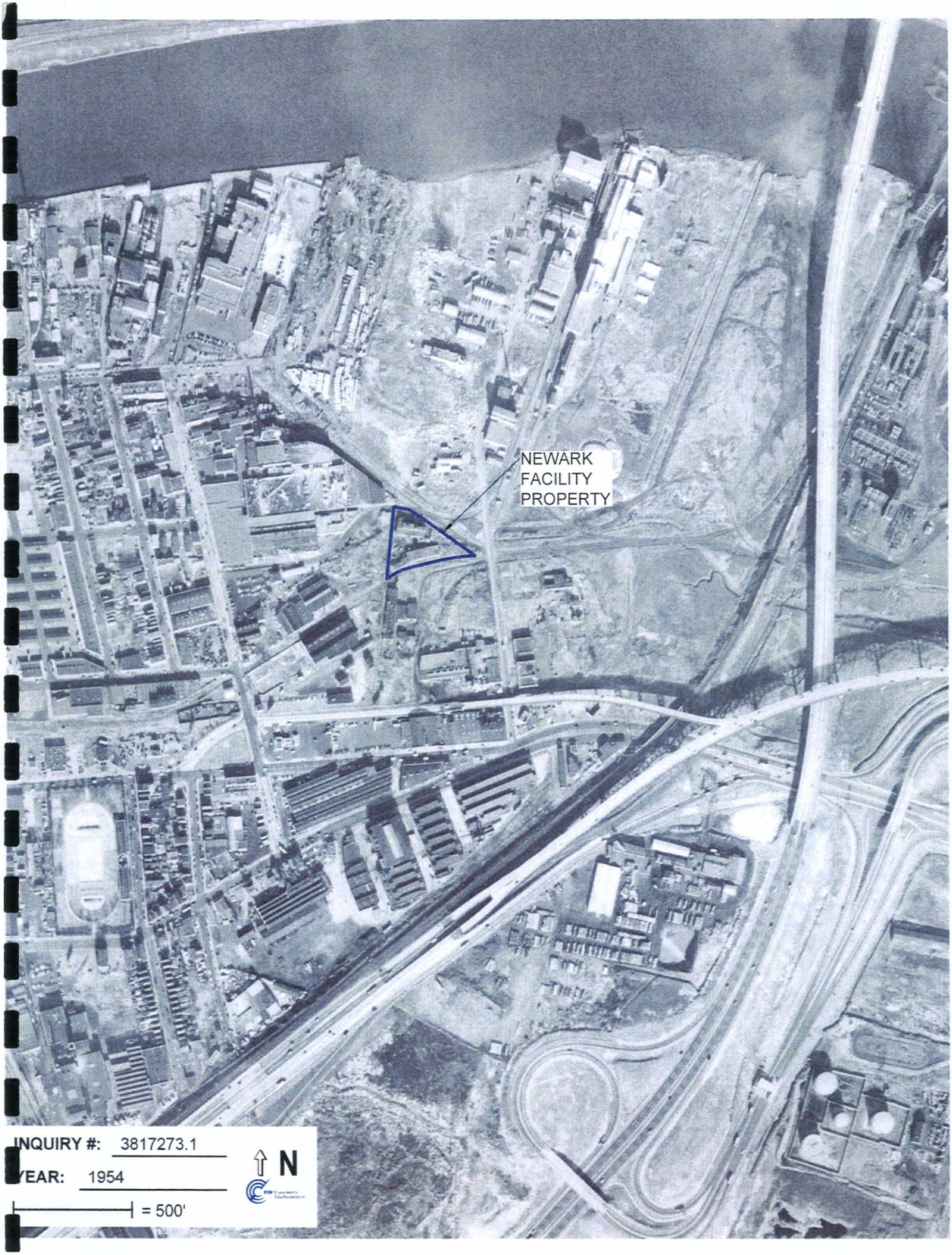

NEWARK
FACILITY
PROPERTY
INQUIRY #: 3817273.1
YEAR: 1991
= 500'
N

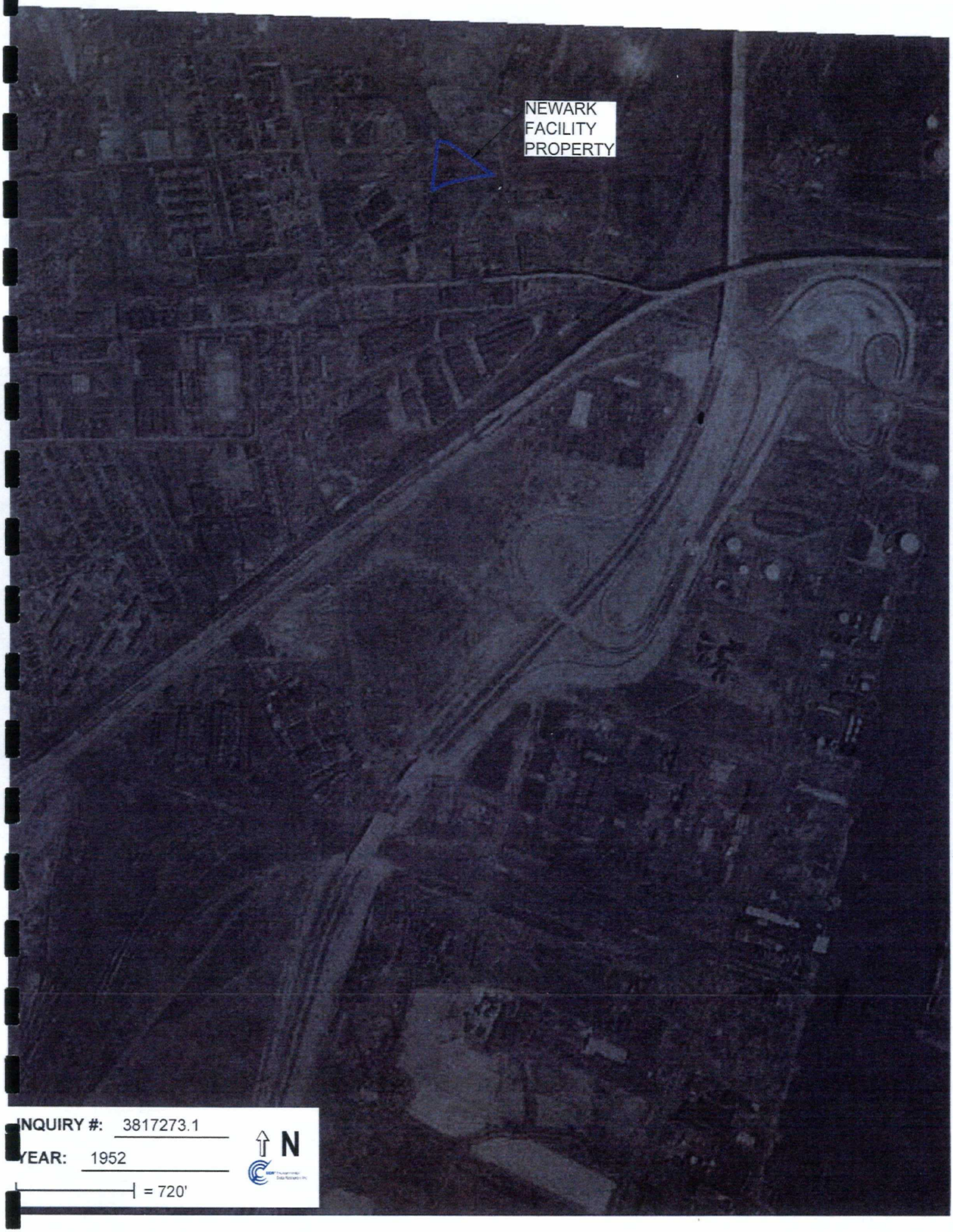

NEWARK
FACILITY
PROPERTY
INQUIRY #: 3817273.1
YEAR: 1984
= 500'
N


NEWARK
FACILITY
PROPERTY
INQUIRY #: 3817273.1
YEAR: 1976
= 1000'
N

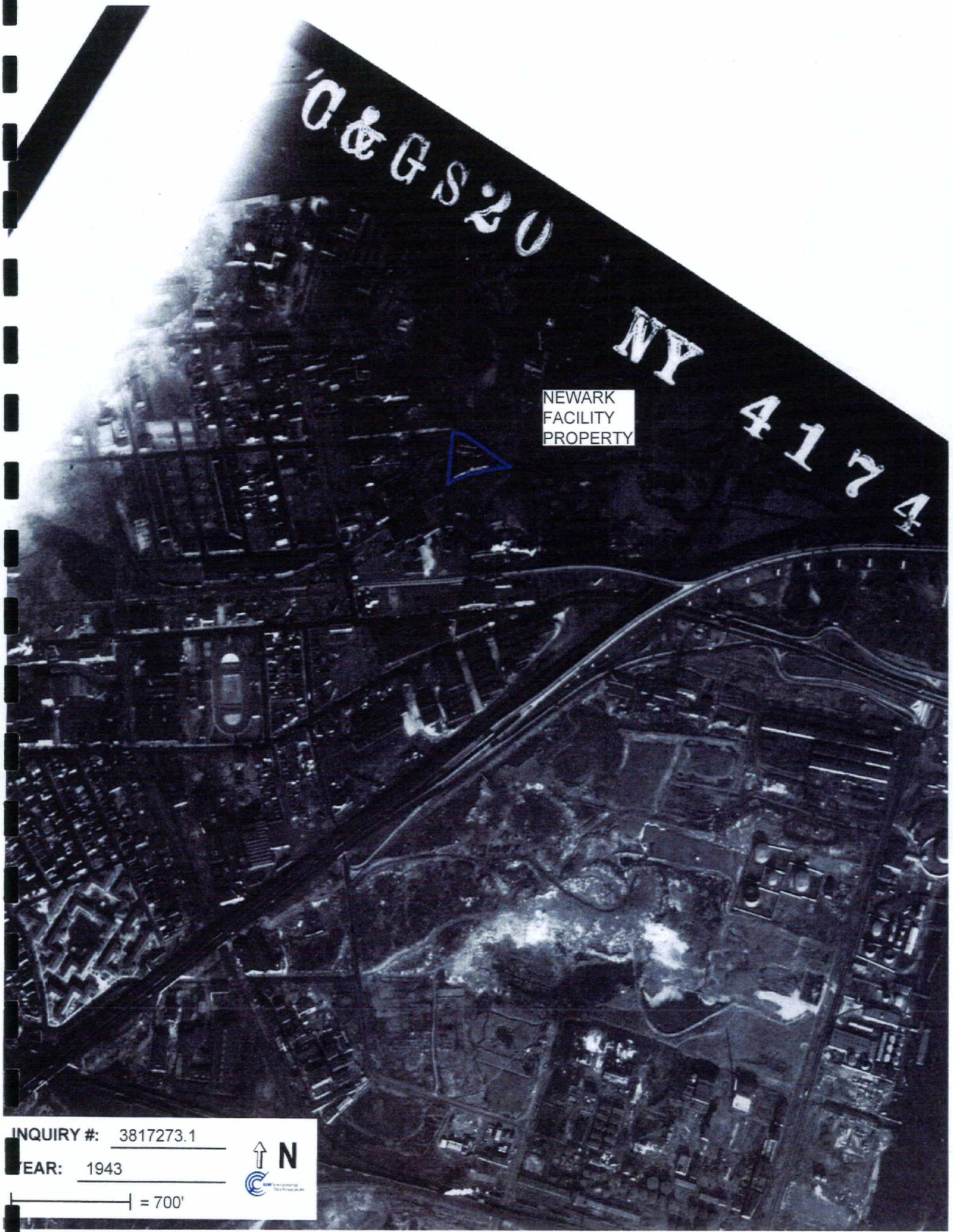

NEWARK
FACILITY
PROPERTY
INQUIRY #: 3817273.1
EAR: 1970
= 500'
N


NEWARK
FACILITY
PROPERTY
INQUIRY #: 3817273.1
YEAR: 1966
= 500'
N


NEWARK
FACILITY
PROPERTY
INQUIRY #: 3817273.1
YEAR: 1954
= 500'
N


NEWARK
FACILITY
PROPERTY
INQUIRY #: 3817273.1
YEAR: 1952
= 720'
N


NEWARK
FACILITY
PROPERTY
INQUIRY #: 3817273.1
YEAR: 1946
= 500'
N

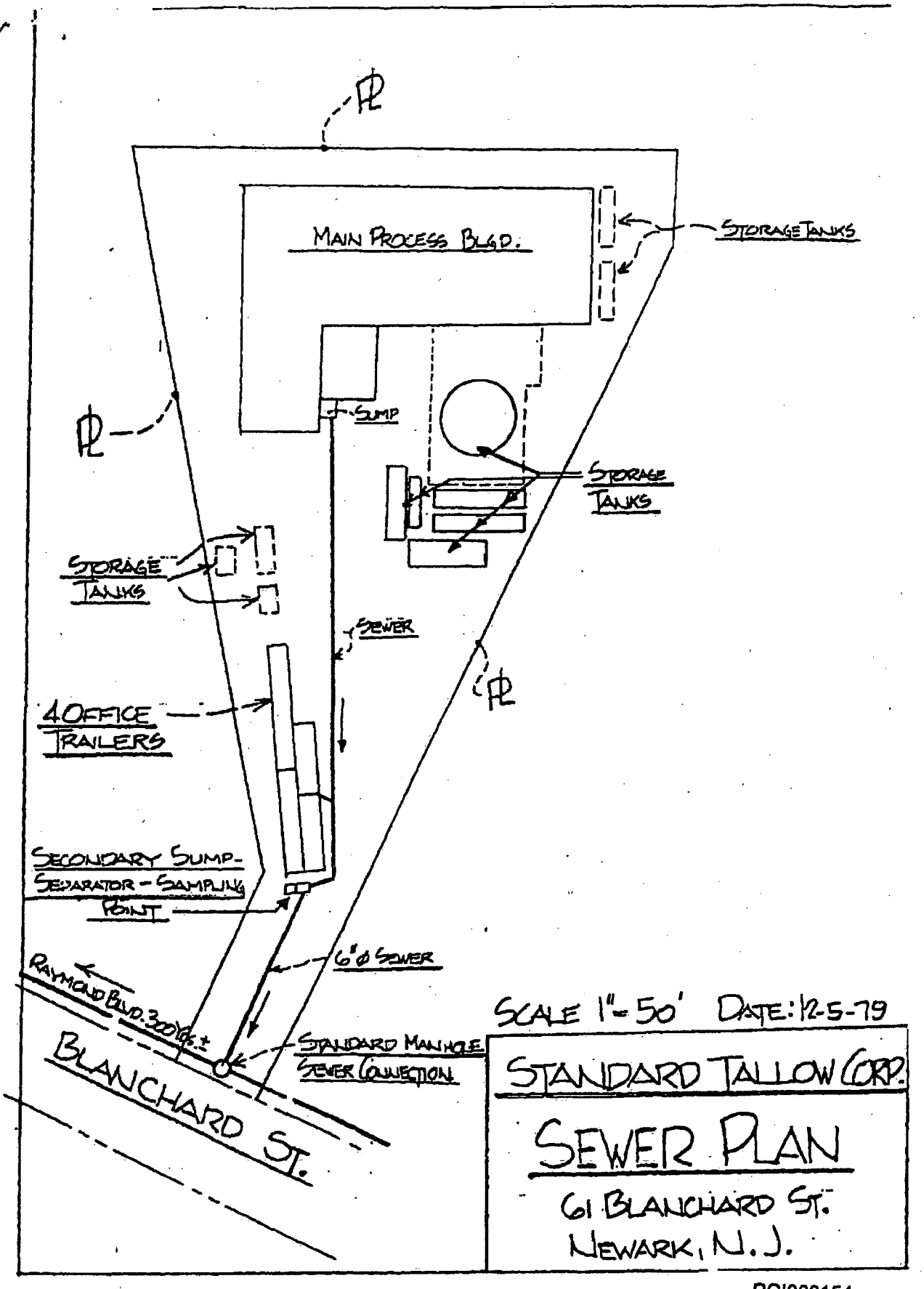

O&GS20
NY 4174
NEWARK
FACILITY
PROPERTY
INQUIRY #: 3817273.1
YEAR: 1943
= 700'
N


NEWARK
FACILITY
PROPERTY
INQUIRY #: 3817273.1
YEAR: 1939
= 500'
N


NEWARK
FACILITY
PROPERTY
INQUIRY #: 3817273.1
YEAR: 1933
= 500'
N

APPENDIX D

NEWARK FACILITY – SITE PLAN


PL
MAIN PROCESS BLG'D.
STORAGE TANKS
SUMP
PL
STORAGE TANKS
STORAGE TANKS
SEWER
PL
4 OFFICE TRAILERS
SECONDARY SUMP-SEPARATOR - SAMPLING POINT
6" ø SEWER
RAYMOND BLVD. 300'± ±
STANDARD MANHOLE SEWER CONNECTION
BLANCHARD ST.
SCALE 1"=50' DATE: 12-5-79
STANDARD TALLOW CORP.
SEWER PLAN
61 BLANCHARD ST.
NEWARK, N.J.

PCI000154

APPENDIX E

KEARNY FACILITY – HISTORICAL CITY DIRECTORIES

Former Standard Tallow Site
1215 Harrison Ave
Kearny, NJ 07032

Inquiry Number: 4657987.4
June 24, 2016

The EDR-City Directory Abstract

EDR® Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

TABLE OF CONTENTS

SECTION

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

DESCRIPTION

Environmental Data Resources, Inc.'s (EDR) City Directory Abstract is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's City Directory Abstract includes a search and abstract of available city directory data. For each address, the directory lists the name of the corresponding occupant at five year intervals.

Business directories including city, cross reference and telephone directories were reviewed, if available, at approximately five year intervals for the years spanning 1923 through 2013. This report compiles information gathered in this review by geocoding the latitude and longitude of properties identified and gathering information about properties within 660 feet of the target property.

A summary of the information obtained is provided in the text of this report.

RESEARCH SUMMARY

The following research sources were consulted in the preparation of this report. An "X" indicates where information was identified in the source and provided in this report.

Year	Source	TP	Adjoining	Text Abstract	Source Image
2013	Cole Information Services	X	X	X	-
2008	Cole Information Services	-	X	X	-
2004	Hill-Donnelly City Publishing	X	X	X	-
2003	City Publishing Co	-	-	-	-
1998	Bell Atlantic New Jersey Inc.	-	-	-	-
1995	Bell Atlantic	X	X	X	-
1992	A Bell Atlantic Company	-	-	-	-
1991	New Jersey Bell	X	X	X	-
1986	New Jersey Bell	X	X	X	-
1985	New Jersey Bell Telephone Co	-	-	-	-
1981	New Jersey Bell	X	X	X	-
1980	New Jersey Bell Telephone Directory	-	-	-	-
1976	New Jersey Bell	X	X	X	-
	New Jersey Bell Telephone Co	X	X	X	-
1972	New Jersey Bell Telephone Co	X	X	X	-
1971	New Jersey Bell Telephone Company	X	X	X	-
1970	New Jersey Bell Telephone	X	X	X	-
1965	New Jersey Bell Telephone Directory	X	X	X	-
1962	New Jersey Bell Telephone Co	X	X	X	-
1960	New Jersey Bell Telephone Company	X	-	X	-
1958	Price Lee Co.	-	-	-	-
1956	The Price & Lee Co.	X	X	X	-
1955	Price Lee Co.	-	-	-	-
1953	New Jersey Bell Telephone Company	-	-	-	-
1952	The Price & Lee Co	X	X	X	-

EXECUTIVE SUMMARY

Year	Source	TP	Adjoining	Text Abstract	Source Image
1951	Price Lee Co.	-	-	-	-
1949	New Jersey Bell Telephone Company	-	-	-	-
1948	The Price & Lee Co	X	X	X	-
1947	Price Lee Co.	-	-	-	-
1945	New Jersey Bell Telephone Company	-	-	-	-
1942	The Price & Lee Co	X	X	X	-
1938	The Price & Lee Co	X	X	X	-
1937	Price Lee Co.	-	-	-	-
1932	New Jersey Bell Telephone Co.	-	X	X	-
1929	The Price & Lee Co	X	X	X	-
1926	R.L. Polk & Co Publishers	-	-	-	-
1924	The Price & Lee Co	-	X	X	-
1923	R. L. Polk & Co.	-	-	-	-

FINDINGS

TARGET PROPERTY INFORMATION

ADDRESS

1215 Harrison Ave
Kearny, NJ 07032

FINDINGS DETAIL

Target Property research detail.

HARRISON AVE

1215 HARRISON AVE

Year	Uses	Source
2013	MIRACLEEAR	Cole Information Services
	NATIONAL DISTRIBUTION	Cole Information Services
	REGIS SUPERCUTS	Cole Information Services
2004	NATIONAL DISTRIBUTION	Hill-Donnelly City Publishing
1995	Hotcard USA	Bell Atlantic
	Logo Fon Inc	Bell Atlantic
	National Distribution	Bell Atlantic
	National Freight Inc	Bell Atlantic
	NFL Exchange	Bell Atlantic
	Standard Tallow Co	Bell Atlantic
1991	American Pacific Enterprises Inc	New Jersey Bell
	Hotcard USA	New Jersey Bell
	National Distribution	New Jersey Bell
	National Freight Inc	New Jersey Bell
1986	NATIONAL FREIGHT INC	New Jersey Bell
	Standard Tallow Co	New Jersey Bell
	Westfield Design Ltd Inc	New Jersey Bell
1981	Boiler Rm	New Jersey Bell
	Eastern States Distribution	New Jersey Bell
	Fornaro Dominick	New Jersey Bell
	Garage	New Jersey Bell
	Guard Shack	New Jersey Bell
	HARRISON BY PRODUCTS CO Office	New Jersey Bell
	M & L Truck Cleaning	New Jersey Bell
	Plant	New Jersey Bell
	Traffic	New Jersey Bell

FINDINGS

Year	Uses	Source
1976	Garage	New Jersey Bell
	HARRISON BY PRODUCTS CO	New Jersey Bell
	Plant	New Jersey Bell
	Schickhaus Co	New Jersey Bell
	Swift & Co Inc	New Jersey Bell
	Swift Process Meat Co	New Jersey Bell
	Van Winkle Casing Co	New Jersey Bell
1972	Industrl Oil Div	New Jersey Bell Telephone Co
	Morgan Clarence Inc	New Jersey Bell Telephone Co
	Packers	New Jersey Bell Telephone Co
	Schickhaus&Van Wagenen Co	New Jersey Bell Telephone Co
	Swift&Co Inc centrl ofcs	New Jersey Bell Telephone Co
	Swift&Co IncGenf Ofcs	New Jersey Bell Telephone Co
	Van Wagenen&Schickhaus Co	New Jersey Bell Telephone Co
1971	By Prods Div	New Jersey Bell Telephone Company
	Gelatin Div	New Jersey Bell Telephone Company
	Gen I Ofcs	New Jersey Bell Telephone Company
	Industrl Oil Div	New Jersey Bell Telephone Company
	Morgan Clarence Inc	New Jersey Bell Telephone Company
	Swift&Co Inc	New Jersey Bell Telephone Company
	Swift&Co Inc centrl ofcs	New Jersey Bell Telephone Company
1970	By Prods Div	New Jersey Bell Telephone
	Gelatin Div	New Jersey Bell Telephone
	Genl Ofcs	New Jersey Bell Telephone
	Globe Life Insurance Co	New Jersey Bell Telephone
	Harrison By Products Co	New Jersey Bell Telephone
	Industrl Oil Div	New Jersey Bell Telephone
	Morgan Clarence Inc	New Jersey Bell Telephone
	Packers	New Jersey Bell Telephone
	Robins Katz Assoc Ltd	New Jersey Bell Telephone
	Schickhaus & Van Wagenen Co	New Jersey Bell Telephone
	Swift & Co Inc	New Jersey Bell Telephone
	Van Wagenen & Schickhaus Co	New Jersey Bell Telephone
1965	By Prods Div	New Jersey Bell Telephone Directory
	Gelatin Div	New Jersey Bell Telephone Directory
	Gen I Ofcs	New Jersey Bell Telephone Directory
	Industrl Oil Div	New Jersey Bell Telephone Directory
	Packers	New Jersey Bell Telephone Directory

FINDINGS

Year	Uses	Source
1965	Swift&Co Inc	New Jersey Bell Telephone Directory
1962	Gelatin Div	New Jersey Bell Telephone Co
	Industrl Oil Div	New Jersey Bell Telephone Co
	Neri A Inc	New Jersey Bell Telephone Co
	Packers	New Jersey Bell Telephone Co
	Schickhaus&Van Wagenen Co	New Jersey Bell Telephone Co
	Van Wagenen&Schickhaus Co	New Jersey Bell Telephone Co
1960	By Prods Div	New Jersey Bell Telephone Company
	Gelatin Div	New Jersey Bell Telephone Company
	Indstrl Oil Div	New Jersey Bell Telephone Company
	Packers	New Jersey Bell Telephone Company
	Schickhaus & Van Wagenen Co	New Jersey Bell Telephone Company
	Swift & Co Genl Ofcs	New Jersey Bell Telephone Company
	Swift&Co	New Jersey Bell Telephone Company
	Van Wagenen & Schickhaus Co	New Jersey Bell Telephone Company
1956	Swift & Co meat KC	The Price & Lee Co.
1952	Swift & Co meat	The Price & Lee Co
1948	Swift & Co meat	The Price & Lee Co
1942	SSwift & Co meat	The Price & Lee Co
1938	Swift & Co meat	The Price & Lee Co
1929	Swift & Co meat	The Price & Lee Co

HARRISON ST

1215 HARRISON ST

Year	Uses	Source
1981	National Freight Inc	New Jersey Bell

FINDINGS

ADJOINING PROPERTY DETAIL

The following Adjoining Property addresses were researched for this report. Detailed findings are provided for each address.

HARRISON AVE

1100 HARRISON AVE

Year	Uses	Source
2013	SOS GASES INC	Cole Information Services
	WELDON MATERIALS INC	Cole Information Services
2008	WELDON ASPHALT CO	Cole Information Services
	SOS GASES INC	Cole Information Services
2004	WELDON ASPHALT CORP	Hill-Donnelly City Publishing
1995	SOS Gases Inc	Bell Atlantic
	Tri County Asphalt Corp	Bell Atlantic
1991	SOS Gases Inc	New Jersey Bell
1986	SOS Gases Inc	New Jersey Bell
1981	SOS GASES INC	New Jersey Bell
1976	S O S GASES	New Jersey Bell
1970	Celutone Co	New Jersey Bell Telephone
	M G Scientific Gases Division of M G Technical Products Inc	New Jersey Bell Telephone
	S O S GASES	New Jersey Bell Telephone

1106 HARRISON AVE

Year	Uses	Source
2013	DREW CHEMICAL CORP	Cole Information Services
	ASHLAND	Cole Information Services
2008	KEARNY CHEMICALS	Cole Information Services
	ASHLAND INC	Cole Information Services
2004	DREWCHEMICAL CORP	Hill-Donnelly City Publishing
	DREWCHEMICAL CORP	Hill-Donnelly City Publishing
	DREW CHEMICAL CORP	Hill-Donnelly City Publishing
1995	Drew Chemical Corp	Bell Atlantic
	Drew Chemical Corp	Bell Atlantic
1991	Drew Chemical Corp	New Jersey Bell
	Drew Chemical Corp	New Jersey Bell
1986	Drew Chemical Corp	New Jersey Bell
	Drew Chemical Corp	New Jersey Bell

FINDINGS

Year	Uses	Source
1981	Drew Chemical Corp	New Jersey Bell
1976	Drew Chemical Carp	New Jersey Bell
1970	SUN CHEMICAL CORP	New Jersey Bell Telephone

1130 HARRISON AVE

Year	Uses	Source
1924	D & L Gas and Oil Co	The Price & Lee Co

1150 HARRISON AVE

Year	Uses	Source
2013	MEADOW DISTRIBUTION SERVICE	Cole Information Services
2008	MEADOW DISTRIBUTION SERVICE	Cole Information Services
2004	MEADOWDISTRIBUTION SERVICE	Hill-Donnelly City Publishing

1161 HARRISON AVE

Year	Uses	Source
1972	Gillison Minnie	New Jersey Bell Telephone Co
	Cabassa V	New Jersey Bell Telephone Co
1971	Cabassa V	New Jersey Bell Telephone Company
1932	Curry Jas H tuims iiover	New Jersey Bell Telephone Co.

1166 HARRISON AVE

Year	Uses	Source
1972	Taylor R	New Jersey Bell Telephone Co

1168 HARRISON AVE

Year	Uses	Source
1976	Lauda H V	New Jersey Bell Telephone Co

1200 HARRISON AVE

Year	Uses	Source
2013	NORTH JERSEY AREA LOCAL	Cole Information Services
	NJ P M P C MAIL HANDLERS	Cole Information Services
2008	UNITED STATES POSTAL SERVICE	Cole Information Services
	MENLO WORLDWIDE FORWARDING INC	Cole Information Services
	USPS NJ METRO PMPC	Cole Information Services
	US GOVERNMENT POST OFFICE	Cole Information Services
2004	CBFTRUCKING INC	Hill-Donnelly City Publishing
	NATIONAL FREIGHT INC	Hill-Donnelly City Publishing
	NORTH JERSEYAREA LOCALA PWU	Hill-Donnelly City Publishing

FINDINGS

Year	Uses	Source
2004	RAPISTAN DEMAG CORP	Hill-Donnelly City Publishing
	SECURITAS SECURITY SVC USA INC	Hill-Donnelly City Publishing
1995	National Distribution Centers L P	Bell Atlantic
	Philip Morris Inc	Bell Atlantic
	Pioneer Food Merchants Association Inc	Bell Atlantic
	White Rose Dairy Corp	Bell Atlantic
1991	National Distribution Centers	New Jersey Bell
	Philip Morris Inc	New Jersey Bell
	White Rose Dairy Corp	New Jersey Bell
1981	City Line Truck Service	New Jersey Bell
	Export Truck Sales & Parts Inc	New Jersey Bell
	Linde Griffith Construction Co	New Jersey Bell
	Crescent Eli Dorer Construction Co	New Jersey Bell
1976	Cord Machinery	New Jersey Bell
1970	WOBURN CHEMICAL CORP	New Jersey Bell Telephone
	Woburn Degreasing Co	New Jersey Bell Telephone
1962	Reimiold A G H ofc	New Jersey Bell Telephone Co
	Woburn Chemical Corp	New Jersey Bell Telephone Co
	Woburn Degreasing Co	New Jersey Bell Telephone Co
1956	Woburn Chemical Corp of NJ	The Price & Lee Co.
1952	Woburn Chemical Corp of NJ	The Price & Lee Co
1948	Woburn Chemical Corp of N J	The Price & Lee Co
1942	Woburn Degreasing Co of NJ	The Price & Lee Co
	leather finishers	The Price & Lee Co
1938	Woburn Degreasing Co of NJ	The Price & Lee Co
	factory	The Price & Lee Co
1929	Woburn Degrelasing Co	The Price & Lee Co
	of NJ factory	The Price & Lee Co
1924	Woburn Degreasing Co	The Price & Lee Co
	of N J	The Price & Lee Co

1201 HARRISON AVE

Year	Uses	Source
2008	LINDE GRIFFITH CONSTRUCTION CO	Cole Information Services

1217 HARRISON AVE

Year	Uses	Source
2004	FLEXIBLE FREIGHT	Hill-Donnelly City Publishing

FINDINGS

1221 HARRISON AVE

Year	Uses	Source
1976	Richardson L	New Jersey Bell Telephone Co

1222 HARRISON AVE

Year	Uses	Source
1972	Richardson L	New Jersey Bell Telephone Co
1965	Riciardson S	New Jersey Bell Telephone Directory

1223 HARRISON AVE

Year	Uses	Source
2004	NORTHSIDE CONSTRUCTION	Hill-Donnelly City Publishing
1995	Petrozello Maplewood Disposal Co	Bell Atlantic
	Petrozello Disposal Co	Bell Atlantic
1991	Petrozello Maplewood Disposal Co	New Jersey Bell
	Petrozello Jas contractor	New Jersey Bell
1986	Petrozello Maplewood Disposal Co	New Jersey Bell
	Petrozello Jas contractor	New Jersey Bell
	Central Salvage Co	New Jersey Bell
1981	Petrozello Maplewood Disposal Co	New Jersey Bell
	Petrozello Jas contractor	New Jersey Bell
	Central Salvage Co	New Jersey Bell
1952	Verzaleno B Steel Drum Co	The Price & Lee Co

1225 HARRISON AVE

Year	Uses	Source
1962	Petrozello Jas ccntractors	New Jersey Bell Telephone Co
1956	change auto bodies	The Price & Lee Co.
	Harrison Turnpike Body Ex	The Price & Lee Co.
1952	change auto bodies	The Price & Lee Co
	Harrison Turnpike Body Ex	The Price & Lee Co
1948	change auto bodies	The Price & Lee Co
	Harrison Turnpike Body Ex	The Price & Lee Co
1942	Harrison Av H K continued	The Price & Lee Co
	Newark Stock Yards	The Price & Lee Co
	change auto bodies	The Price & Lee Co
	Harrison Turnpike Body Ex	The Price & Lee Co
1938	Newark Stock Yards	The Price & Lee Co
	change auto bodies	The Price & Lee Co
	Harrison Turnpike Body Ex	The Price & Lee Co

FINDINGS

Year	Uses	Source
1929	Newark i Stock Yards	The Price & Lee Co

1233 HARRISON AVE

Year	Uses	Source
1986	Pet Am Co	New Jersey Bell
1981	Pet Am Co	New Jersey Bell

1235 HARRISON AVE

Year	Uses	Source
2013	CAMPBELL FOUNDRY MATERIALS DIVISION	Cole Information Services
2004	KELLYSPRINGFIELD TRUCKING CO	Hill-Donnelly City Publishing
	CAMPBELL FOUNDRY MTRLS DVSN	Hill-Donnelly City Publishing
1995	Kelly Springfield Trucking Co	Bell Atlantic
1991	Kelly Springfield Trucking Co	New Jersey Bell
1986	KELLY SPRINGFIELD TRUCKING CO	New Jersey Bell
1981	Kelly Springfield Trucking Co	New Jersey Bell
1976	Kelly Springfield Trckg Co	New Jersey Bell
1970	Kelly Springfield Trckg Co	New Jersey Bell Telephone
1962	Kelly Springfield Trckg Co	New Jersey Bell Telephone Co
	K S T Co	New Jersey Bell Telephone Co

1237 HARRISON AVE

Year	Uses	Source
1986	Calmett	New Jersey Bell
1981	Calmett	New Jersey Bell

1250 HARRISON AVE

Year	Uses	Source
1948	Vacant store	The Price & Lee Co
1942	Kohnstamm H & Co Inc laun	The Price & Lee Co
	dry supplies	The Price & Lee Co
1938	Kohnstamm H & Co Inc laun	The Price & Lee Co
	dry supplies	The Price & Lee Co
	Hudson County Mosquito Com	The Price & Lee Co
	mission	The Price & Lee Co
1929	laundry supplies	The Price & Lee Co
	Kohnstamm H & Co Inc	The Price & Lee Co
	Seaboard By Products	The Price & Lee Co
	Ooke Co	The Price & Lee Co

FINDINGS

Year	Uses	Source
1929	Hudson County Mosqui	The Price & Lee Co
	to Commission	The Price & Lee Co
	Penn RR repair shops	The Price & Lee Co
	Vaeant store	The Price & Lee Co

HARRISON CT

1150 HARRISON CT

Year	Uses	Source
1976	Cristelli Pat Trucking Co	New Jersey Bell

HARRISON TPKE

1235 HARRISON TPKE

Year	Uses	Source
2008	KELLY SPRINGFIELD TRUCKING CO	Cole Information Services
	CAMPBELL FOUNDRY CO	Cole Information Services

FINDINGS

TARGET PROPERTY: ADDRESS NOT IDENTIFIED IN RESEARCH SOURCE

The following Target Property addresses were researched for this report, and the addresses were not identified in the research source.

Address Researched	Address Not Identified in Research Source
1215 Harrison Ave	2008, 2003, 1998, 1992, 1985, 1980, 1958, 1955, 1953, 1951, 1949, 1947, 1945, 1937, 1932, 1926, 1924, 1923

ADJOINING PROPERTY: ADDRESSES NOT IDENTIFIED IN RESEARCH SOURCE

The following Adjoining Property addresses were researched for this report, and the addresses were not identified in research source.

Address Researched	Address Not Identified in Research Source
1100 HARRISON AVE	2004, 2003, 1998, 1995, 1992, 1991, 1986, 1985, 1981, 1980, 1976, 1972, 1971, 1970, 1965, 1962, 1960, 1958, 1956, 1955, 1953, 1952, 1951, 1949, 1948, 1947, 1945, 1942, 1938, 1937, 1932, 1929, 1926, 1924, 1923
1100 HARRISON AVE	2013, 2008, 2003, 1998, 1992, 1985, 1980, 1972, 1971, 1965, 1962, 1960, 1958, 1956, 1955, 1953, 1952, 1951, 1949, 1948, 1947, 1945, 1942, 1938, 1937, 1932, 1929, 1926, 1924, 1923
1106 HARRISON AVE	2013, 2008, 2003, 1998, 1992, 1985, 1980, 1972, 1971, 1965, 1962, 1960, 1958, 1956, 1955, 1953, 1952, 1951, 1949, 1948, 1947, 1945, 1942, 1938, 1937, 1932, 1929, 1926, 1924, 1923
1106 HARRISON AVE	2004, 2003, 1998, 1995, 1992, 1991, 1986, 1985, 1981, 1980, 1976, 1972, 1971, 1970, 1965, 1962, 1960, 1958, 1956, 1955, 1953, 1952, 1951, 1949, 1948, 1947, 1945, 1942, 1938, 1937, 1932, 1929, 1926, 1924, 1923
1130 HARRISON AVE	2013, 2008, 2004, 2003, 1998, 1995, 1992, 1991, 1986, 1985, 1981, 1980, 1976, 1972, 1971, 1970, 1965, 1962, 1960, 1958, 1956, 1955, 1953, 1952, 1951, 1949, 1948, 1947, 1945, 1942, 1938, 1937, 1932, 1929, 1926, 1923
1150 HARRISON AVE	2013, 2008, 2003, 1998, 1995, 1992, 1991, 1986, 1985, 1981, 1980, 1976, 1972, 1971, 1970, 1965, 1962, 1960, 1958, 1956, 1955, 1953, 1952, 1951, 1949, 1948, 1947, 1945, 1942, 1938, 1937, 1932, 1929, 1926, 1924, 1923
1150 HARRISON AVE	2004, 2003, 1998, 1995, 1992, 1991, 1986, 1985, 1981, 1980, 1976, 1972, 1971, 1970, 1965, 1962, 1960, 1958, 1956, 1955, 1953, 1952, 1951, 1949, 1948, 1947, 1945, 1942, 1938, 1937, 1932, 1929, 1926, 1924, 1923
1150 HARRISON CT	2013, 2008, 2004, 2003, 1998, 1995, 1992, 1991, 1986, 1985, 1981, 1980, 1972, 1971, 1970, 1965, 1962, 1960, 1958, 1956, 1955, 1953, 1952, 1951, 1949, 1948, 1947, 1945, 1942, 1938, 1937, 1932, 1929, 1926, 1924, 1923
1161 HARRISON AVE	2013, 2008, 2004, 2003, 1998, 1995, 1992, 1991, 1986, 1985, 1981, 1980, 1976, 1970, 1965, 1962, 1960, 1958, 1956, 1955, 1953, 1952, 1951, 1949, 1948, 1947, 1945, 1942, 1938, 1937, 1929, 1926, 1924, 1923
1166 HARRISON AVE	2013, 2008, 2004, 2003, 1998, 1995, 1992, 1991, 1986, 1985, 1981, 1980, 1976, 1971, 1970, 1965, 1962, 1960, 1958, 1956, 1955, 1953, 1952, 1951, 1949, 1948, 1947, 1945, 1942, 1938, 1937, 1932, 1929, 1926, 1924, 1923
1168 HARRISON AVE	2013, 2008, 2004, 2003, 1998, 1995, 1992, 1991, 1986, 1985, 1981, 1980, 1972, 1971, 1970, 1965, 1962, 1960, 1958, 1956, 1955, 1953, 1952, 1951, 1949, 1948, 1947, 1945, 1942, 1938, 1937, 1932, 1929, 1926, 1924, 1923
1200 HARRISON AVE	2013, 2008, 2003, 1998, 1992, 1986, 1985, 1980, 1972, 1971, 1965, 1960, 1958, 1955, 1953, 1951, 1949, 1947, 1945, 1937, 1932, 1926, 1923

FINDINGS

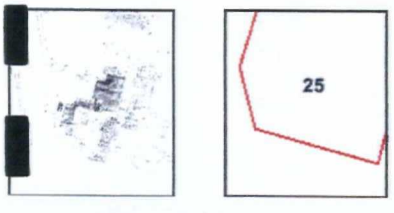
Address Researched	Address Not Identified in Research Source
1200 HARRISON AVE	2004, 2003, 1998, 1995, 1992, 1991, 1986, 1985, 1981, 1980, 1976, 1972, 1971, 1970, 1965, 1962, 1960, 1958, 1956, 1955, 1953, 1952, 1951, 1949, 1948, 1947, 1945, 1942, 1938, 1937, 1932, 1929, 1926, 1924, 1923
1201 HARRISON AVE	2013, 2004, 2003, 1998, 1995, 1992, 1991, 1986, 1985, 1981, 1980, 1976, 1972, 1971, 1970, 1965, 1962, 1960, 1958, 1956, 1955, 1953, 1952, 1951, 1949, 1948, 1947, 1945, 1942, 1938, 1937, 1932, 1929, 1926, 1924, 1923
1217 HARRISON AVE	2013, 2008, 2003, 1998, 1995, 1992, 1991, 1986, 1985, 1981, 1980, 1976, 1972, 1971, 1970, 1965, 1962, 1960, 1958, 1956, 1955, 1953, 1952, 1951, 1949, 1948, 1947, 1945, 1942, 1938, 1937, 1932, 1929, 1926, 1924, 1923
1221 HARRISON AVE	2013, 2008, 2004, 2003, 1998, 1995, 1992, 1991, 1986, 1985, 1981, 1980, 1972, 1971, 1970, 1965, 1962, 1960, 1958, 1956, 1955, 1953, 1952, 1951, 1949, 1948, 1947, 1945, 1942, 1938, 1937, 1932, 1929, 1926, 1924, 1923
1222 HARRISON AVE	2013, 2008, 2004, 2003, 1998, 1995, 1992, 1991, 1986, 1985, 1981, 1980, 1976, 1971, 1970, 1962, 1960, 1958, 1956, 1955, 1953, 1952, 1951, 1949, 1948, 1947, 1945, 1942, 1938, 1937, 1932, 1929, 1926, 1924, 1923
1223 HARRISON AVE	2013, 2008, 2003, 1998, 1992, 1985, 1980, 1976, 1972, 1971, 1970, 1965, 1962, 1960, 1958, 1956, 1955, 1953, 1951, 1949, 1948, 1947, 1945, 1942, 1938, 1937, 1932, 1929, 1926, 1924, 1923
1225 HARRISON AVE	2013, 2008, 2004, 2003, 1998, 1995, 1992, 1991, 1986, 1985, 1981, 1980, 1976, 1972, 1971, 1970, 1965, 1960, 1958, 1955, 1953, 1951, 1949, 1947, 1945, 1937, 1932, 1926, 1924, 1923
1233 HARRISON AVE	2013, 2008, 2004, 2003, 1998, 1995, 1992, 1991, 1985, 1980, 1976, 1972, 1971, 1970, 1965, 1962, 1960, 1958, 1956, 1955, 1953, 1952, 1951, 1949, 1948, 1947, 1945, 1942, 1938, 1937, 1932, 1929, 1926, 1924, 1923
1235 HARRISON AVE	2013, 2008, 2003, 1998, 1992, 1985, 1980, 1972, 1971, 1965, 1960, 1958, 1956, 1955, 1953, 1952, 1951, 1949, 1948, 1947, 1945, 1942, 1938, 1937, 1932, 1929, 1926, 1924, 1923
1235 HARRISON AVE	2008, 2004, 2003, 1998, 1995, 1992, 1991, 1986, 1985, 1981, 1980, 1976, 1972, 1971, 1970, 1965, 1962, 1960, 1958, 1956, 1955, 1953, 1952, 1951, 1949, 1948, 1947, 1945, 1942, 1938, 1937, 1932, 1929, 1926, 1924, 1923
1235 HARRISON TPKE	2013, 2004, 2003, 1998, 1995, 1992, 1991, 1986, 1985, 1981, 1980, 1976, 1972, 1971, 1970, 1965, 1962, 1960, 1958, 1956, 1955, 1953, 1952, 1951, 1949, 1948, 1947, 1945, 1942, 1938, 1937, 1932, 1929, 1926, 1924, 1923
1237 HARRISON AVE	2013, 2008, 2004, 2003, 1998, 1995, 1992, 1991, 1985, 1980, 1976, 1972, 1971, 1970, 1965, 1962, 1960, 1958, 1956, 1955, 1953, 1952, 1951, 1949, 1948, 1947, 1945, 1942, 1938, 1937, 1932, 1929, 1926, 1924, 1923
1250 HARRISON AVE	2013, 2008, 2004, 2003, 1998, 1995, 1992, 1991, 1986, 1985, 1981, 1980, 1976, 1972, 1971, 1970, 1965, 1962, 1960, 1958, 1956, 1955, 1953, 1952, 1951, 1949, 1947, 1945, 1937, 1932, 1926, 1924, 1923

APPENDIX F

KEARNY FACILITY - SANBORN MAPS

Certification # 35B3-4968-86DB

This Certified Sanborn Map combines the following sheets.
Outlined areas indicate map sheets within the collection.



Volume 1, Sheet 25

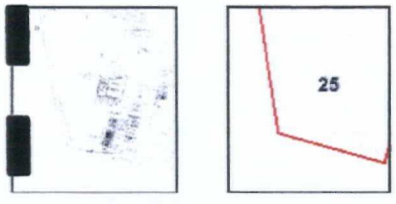
0 Feet 150 300 600

N

Certification # 35B3-4968-86DB

Site Name: Former Standard Tallow Site
Address: 1215 Harrison Ave
City, ST, ZIP: Kearny, NJ 07032
Client: Pastor, Behling, & Wheeler
EDR Inquiry: 4657987.1
Order Date: 06/27/2016
Certification #: 35B3-4968-86DB
Copyright 1907

This Certified Sanborn Map combines the following sheets.
Outlined areas indicate map sheets within the collection.



Volume 1, Sheet 25

0 Feet 150 300 600

N

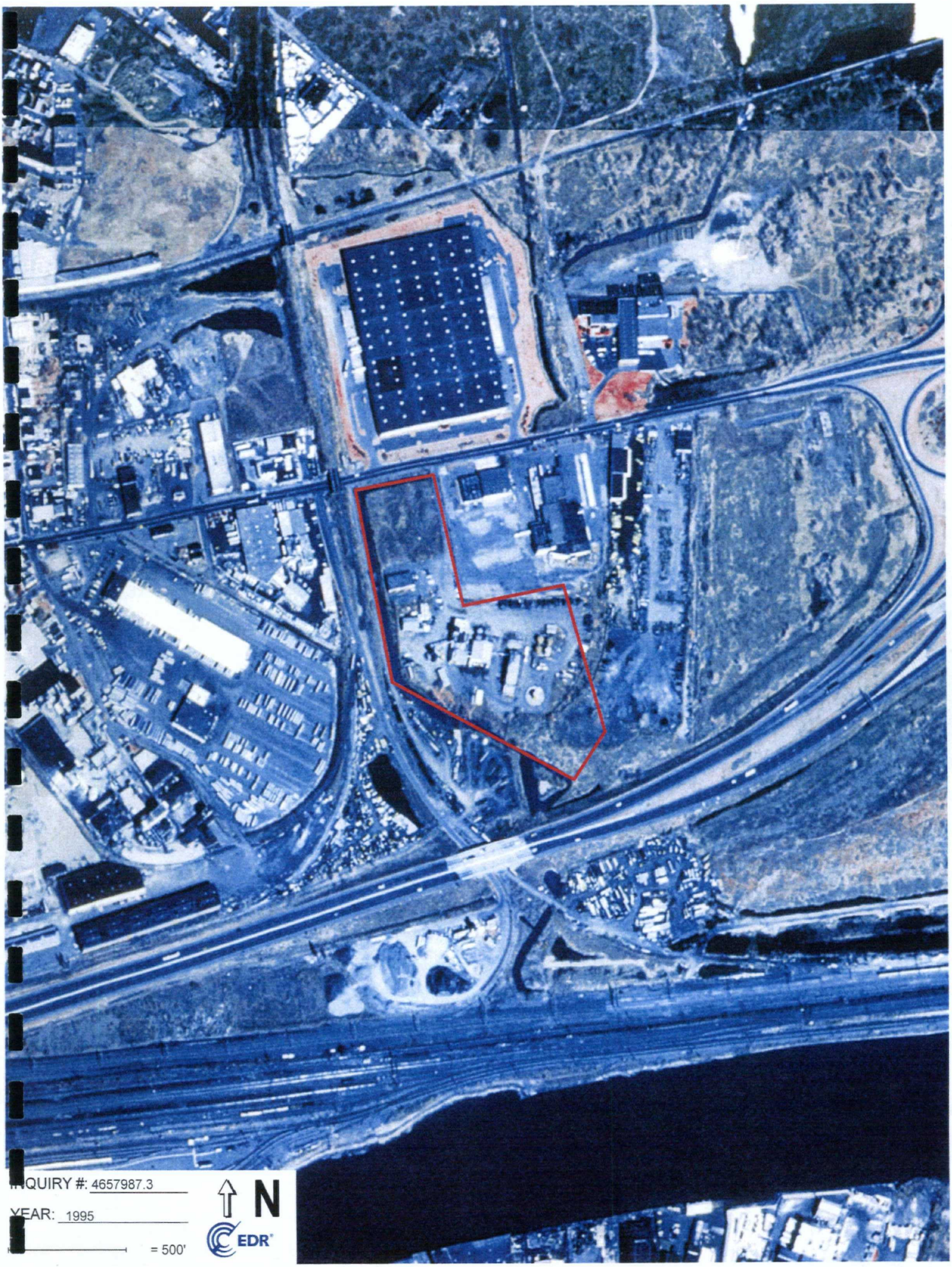
APPENDIX G

KEARNY FACILITY – HISTORICAL AERIAL PHOTOGRAPHS


INQUIRY #: 4657987.3
YEAR: 2010
= 500'
N
EDR


INQUIRY #: 4657987.3
YEAR: 2008
= 500'
N
EDR


QUIRY #: 4657987.3
YEAR: 2006
= 500'
N
EDR



INQUIRY #: 4657987.3

YEAR: 1995

= 500'

N

EDR


QUIRY #: 4657987.3
YEAR: 1991
= 500'
N
EDR


QUIRY #: 4657987.3
YEAR: 1984
= 500'
N
EDR

QUIRY #: 4657987.3

YEAR: 1974

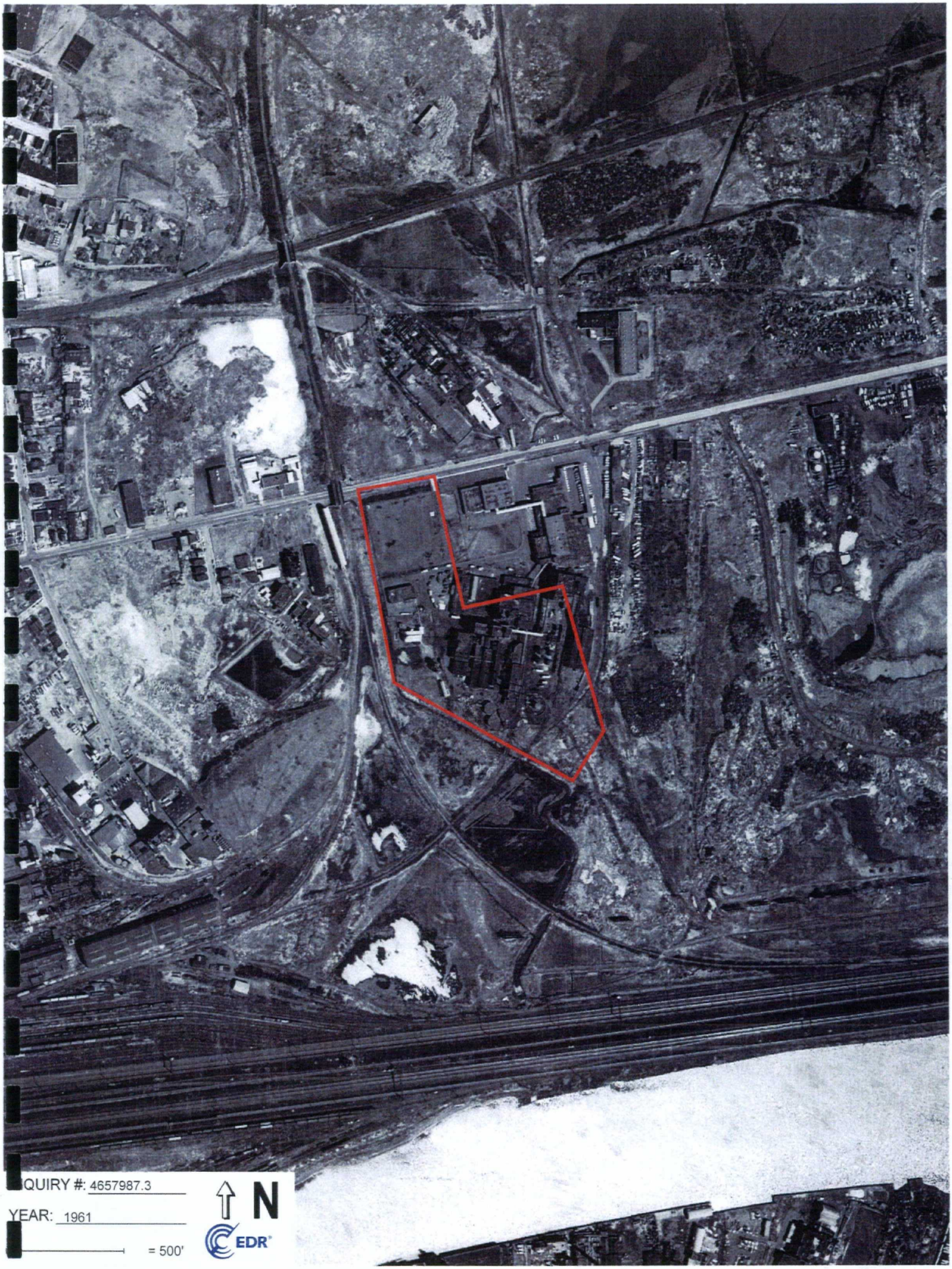
= 500'

N

EDR


INQUIRY #: 4657987.3
YEAR: 1970
= 500'
N
EDR

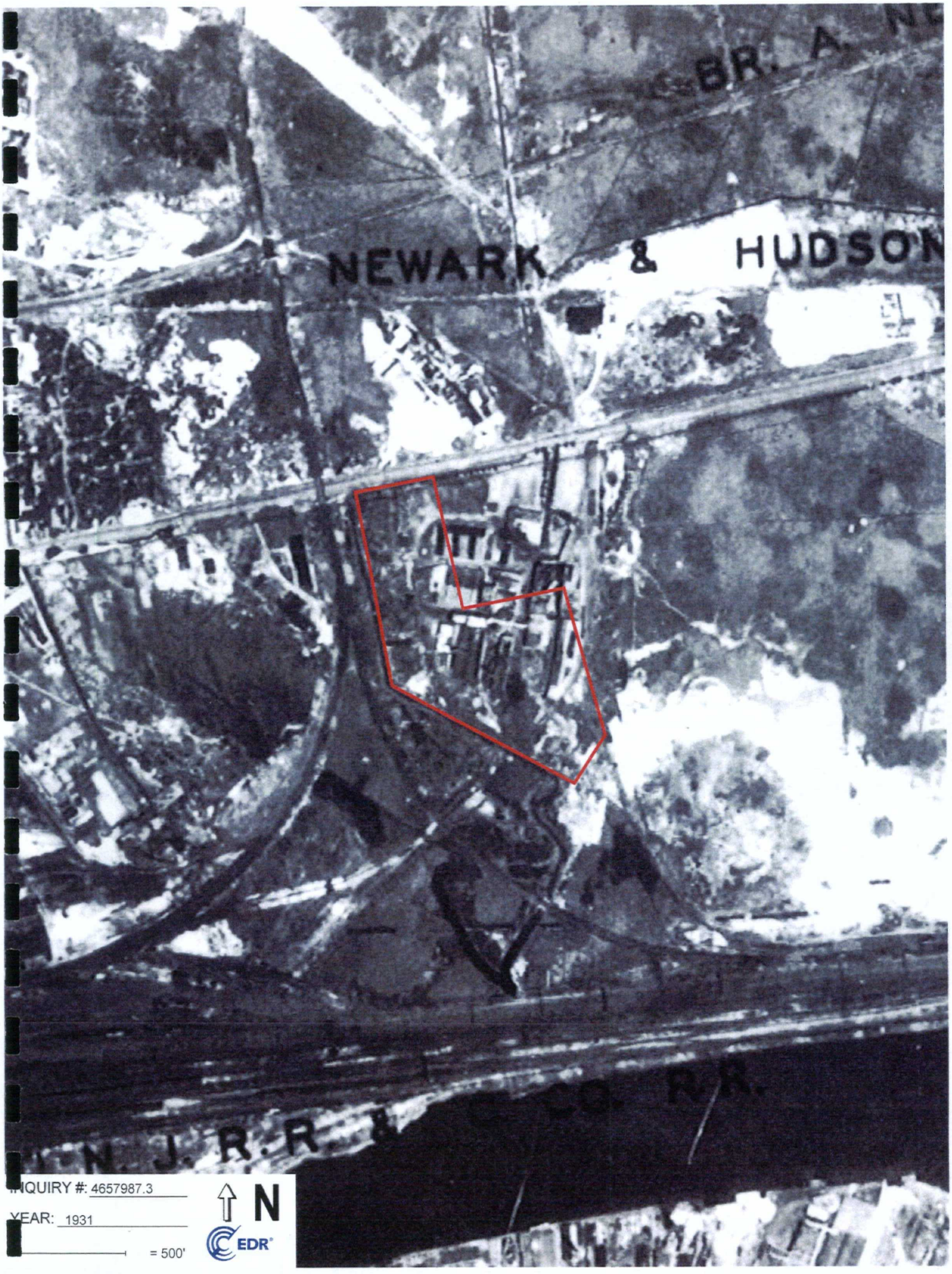

QUIRY #: 4657987.3
YEAR: 1966
= 500'
N
EDR


QUIRY #: 4657987.3
YEAR: 1961
= 500'
N
EDR


QUIRY #: 4657987.3
YEAR: 1954
= 500'
N
EDR


QUIRY #: 4657987.3
YEAR: 1951
= 500'
N
EDR


INQUIRY #: 4657987.3
YEAR: 1940
= 500'
N
EDR



INQUIRY #: 4657987.3

YEAR: 1931

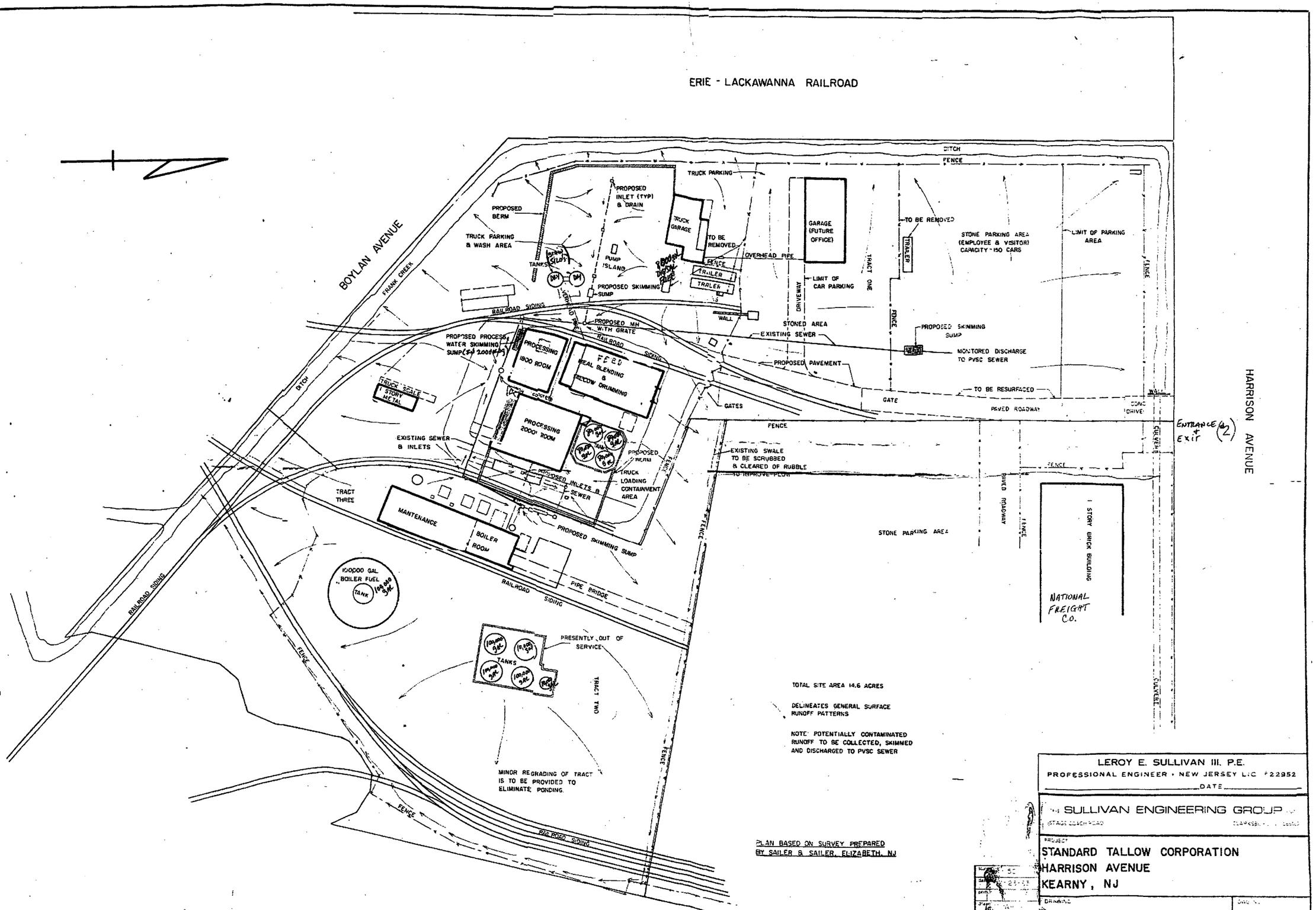
= 500'

N

EDR

APPENDIX H

KEARNY FACILITY – SITE PLAN



LEROY E. SULLIVAN III, P.E.
PROFESSIONAL ENGINEER • NEW JERSEY LIC #22952
DATE

THE SULLIVAN ENGINEERING GROUP
STAGE COACH ROAD CLARKSBURG, NEW JERSEY

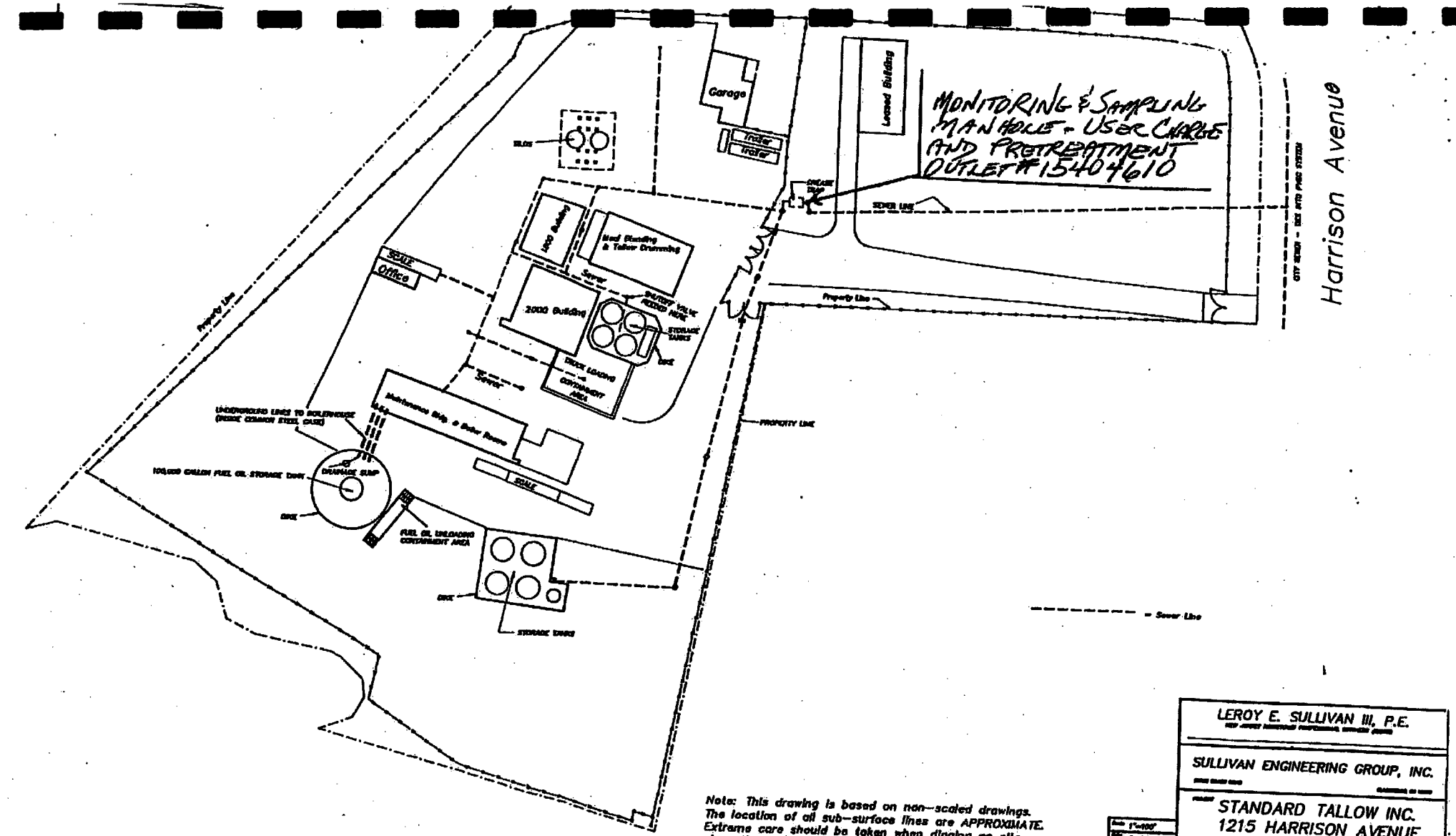
PROJECT
STANDARD TALLOW CORPORATION
HARRISON AVENUE
KEARNY, NJ

DRAWING
SITE & DRAINAGE PLAN

DWG. NO. 1001

APPENDIX I

KEARNY FACILITY – CONNECTION TO PVSC COMBINED SEWER SYSTEM



Note: This drawing is based on non-scaled drawings.
The location of all sub-surface lines are APPROXIMATE.
Extreme care should be taken when digging on site since these lines are NOT located where shown.
Also, other lines are known to exist which are not included

LEROY E. SULLIVAN III, P.E.

SULLIVAN ENGINEERING GROUP, INC.

STANDARD TALLOW INC.
1215 HARRISON AVENUE
KEARNY, NEW JERSEY

SITE PLAN

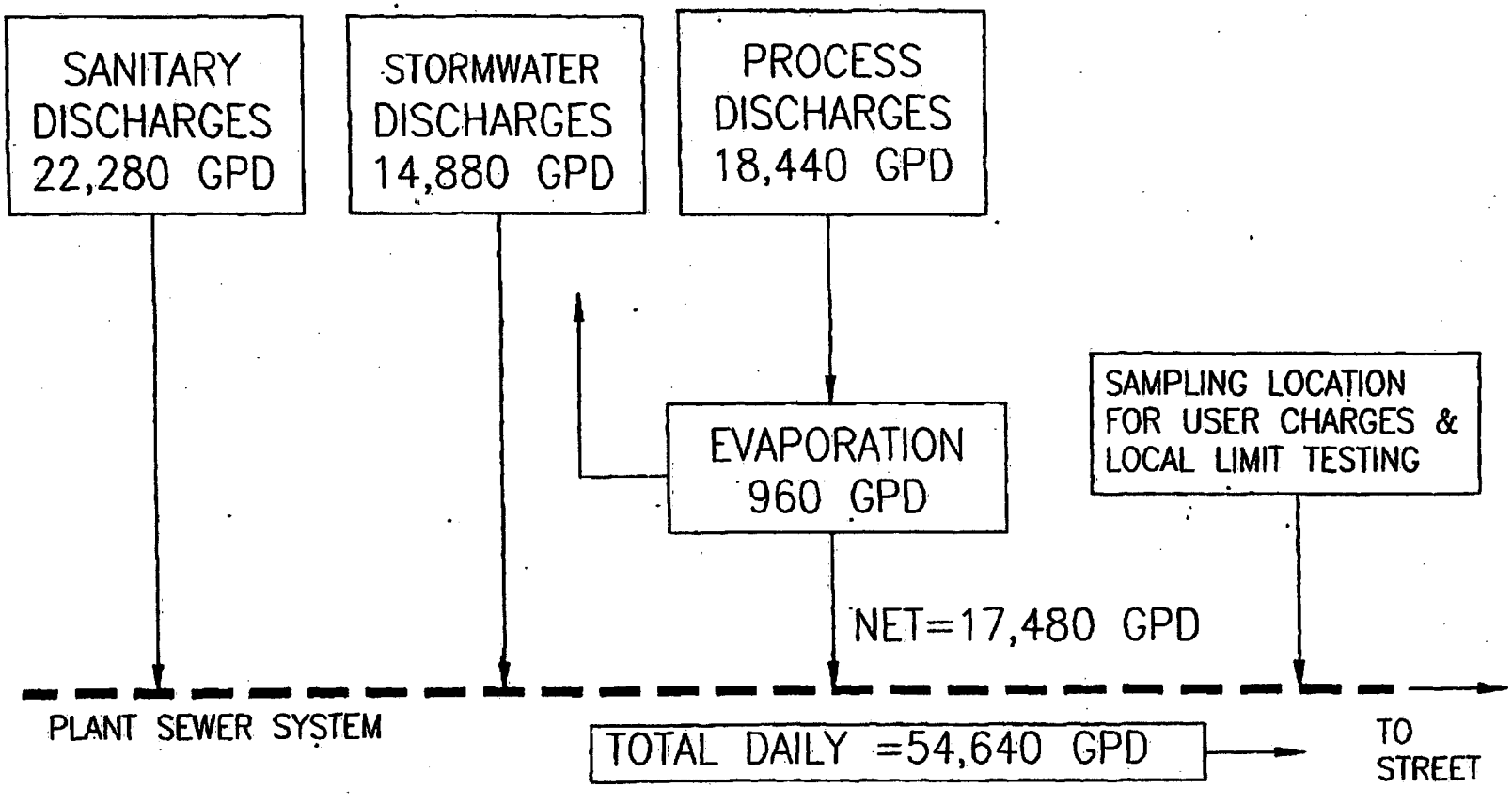
89-1001

APPENDIX J

KEARNY FACILITY – SIMPLIFIED WASTEWATER AND STORM WATER FLOW DIAGRAM

STANDARD TALLOW CORP.
SEWER EFFLUENT FLOW DIAGRAM

DECEMBER, 1994



PCI000010